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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

MEMORANDUM

Date: 5/21/2004

Subject: Ipconazole. Determination of Proposed Seed Treatment Uses as Food or Non-Food Uses. Summary of Analytical Chemistry and Residue Data.

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Executive Summary

Ipconazole is a new chemical proposed for seed treatment use on various crops. It is a systemic, broad-spectrum fungicide seed dressing used to protect plants from soil borne and seed borne disease.

The registrant, Gustafson LLC, has submitted an application to register a liquid formulation containing 40.7% ipconazole (Vortex™ Seed Treatment Fungicide, EPA Reg. No. 7501-ROL). The formulation is proposed for seed treatment on root and tuber vegetables, leafy vegetables (except Brassica vegetables), Brassica (cole) leafy vegetables, cucurbit vegetables, cereal grains including forage and silage, grass (forage, fodder, and hay), nongrass animal feeds (forage, fodder, straw, and hay), cotton, sunflower, mustard, rape, and canola. The proposed application rates for seed treatment range from 0.043 to 0.34 fl. oz of product per 100 lbs of seed (0.0013 to 0.010 lb ai/100 lbs seed).

No tolerances have been proposed for residues of ipconazole. The registrant has requested that the seed treatments be considered non-food uses. Therefore, in support of the registration application, Gustafson has submitted radiotracer studies for the following crops: canola (MRID 45542247), carrots (MRID 45542245), corn (MRID 45542241), cotton (MRID 45542239), cucumbers (45542242), leaf lettuce (MRID 45542244), sorghum (MRID 45542240), soybean (MRIDs 45542243 and 45542248), and wheat (MRIDs 45542246 and 45542248). These data submissions were screened for residues found, and only those uses that can be classified as non-food, based on the current seed treatment policy, were reviewed.

The Agency's seed treatment policy is addressed on page 3 of the OPPTS Series 860 Guidelines, Section 1000. The Guideline specifies that "in order for a seed treatment to be considered a non-food use, data from a radiotracer study must be available showing no uptake of residues (radioactivity) from treated seed into the aerial portion of the growing crop....If residues occur in the aerial portion of the plant, or if there are no data available to make this determination, then seed treatments are considered to be food uses requiring tolerances." The OPPTS Guideline does not specify in quantitative terms what is meant by "no uptake of residues." The HED Chemistry Science Advisory Council, in a memo dated 10/28/99, concluded that this phrase means that the total radioactive residue (TRR) needs to be 5 ppb (0.005 ppm) or lower to establish "no uptake of residues," and thus have the use be considered non-food.

The Agency has screened all studies included in the review package. The submitted radiotracer studies for soybean and wheat were not fully reviewed because the data show that seed treatment uses on these crops should be classified as food uses requiring tolerances. Residues exceeded 5 ppb in/on the RACs following seed treatment at the rates used in the respective studies.

The radiotracer studies for canola, carrot, cotton, cucumber, leaf lettuce, and sorghum are adequate to classify the proposed seed treatment uses of ipconazole on these crops as non-food uses. In addition, the study for corn is adequate to classify the proposed seed treatment use as a non-food use provided the registrant submits a revised label that specifies a maximum

application rate of 0.0013 lb ai/100 lbs of seed. Data Evaluation Records (DERs) of studies submitted for the crops listed above (including corn) were prepared, and the results are summarized in this document.

With respect to which crops (in addition to those that have radiolabeled data) can be considered non-food uses, HED will use a crop group approach that was discussed with the petitioner in several pre-registration meetings (R. Loranger, 9/23/98 and 2/9/99). The results for carrots support a non-food use for the requested seed treatment of root and tuber vegetables. Similarly, the lettuce data will cover the proposed uses on leafy vegetables (both Brassica and non-Brassica). The cucumber data support the seed treatment of cucurbit vegetables as a non-food use. The sorghum, cotton, and canola uses are also non-food based on the three studies submitted for those crops. In addition, the cotton data will be translated to sunflower, and the canola data to mustard and rape. In the case of corn (field, pop, sweet), the uses can be considered non-food if the maximum application rate is 0.0013 lb ai/100 lb seed or less. Assuming residues are proportional to the rate, this use would result in <5 ppb TRR in corn grain (where 5.5 ppb TRR was found after treatment at 0.0015 lb ai/100 lb seed).

Although uses discussed in the previous paragraph can be considered non-food, HED cannot conclude that all of the requested uses are non-food. This is because in wheat and soybean radiotracer studies, uptake of total radioactivity was greater than 5 ppb in wheat forage/hay/straw and soybean hay. As a result, the following label changes are recommended. The cereal grain uses should be limited to just corn and sorghum. Other grains such as millet, oats, rice, and rye should be removed from the label. With the exception of turfgrass (which is not a food or feed crop), the uses on the grass forage, fodder, and hay group should also be deleted. Finally, treatment of all nongrass animal feeds also needs to be dropped.

In summary, HED can conclude that the following ipconazole seed treatment uses are non-food: root and tuber vegetables, leafy vegetables (Brassica and non-Brassica), cucurbit vegetables, sorghum, cotton, sunflower, canola, rape, mustard, turfgrass, and corn (field, pop, sweet) (provided label is amended to maximum rate of 0.0013 lb ai/100 lb seed),.

The qualitative nature of the residue in plants and animals is not adequately understood. Plant and animal metabolism data are not required, however, if seed treatment uses of ipconazole are to be registered only on those crops for which the available data suggest a non-food use classification. The registration requirements for an analytical enforcement method, as well as other residue chemistry guideline topics which are typically required for food uses, would also not be required for the crops listed above as non-food uses. No tolerances have been proposed or established for ipconazole residues of concern in/on plant and animal commodities.

Residue Chemistry Deficiencies

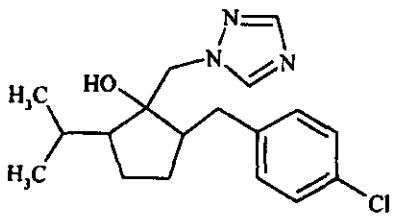
Based on the available data from the radiotracer studies, some of the proposed uses cannot be classified as non-food. The registrant needs to submit a revised label that specifies a maximum application rate for corn of 0.0013 lb ai/100 lbs of seed. The cereal grain uses need to be limited

to corn and sorghum only. With the exception of turfgrass, uses on the grass forage, fodder, and hay group should be deleted. Treatment of all non-grass animal feeds also needs to be dropped from the label.

Background

The chemical structure and nomenclature of ipconazole are listed below in Table 1. The physical and chemical properties are given in Table 2.

TABLE 1. Test Compound Nomenclature.

Compound	
Common name	Ipconazole
Company experimental name	None specified
IUPAC name	(1*RS*, 2*SR*, 5*RS*; 1*RS*, 2*SR*, 5*SR*)-2-(4-chlorobenzyl)-5-isopropyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
CAS name	2-[(4-chlorophenyl)methyl]-5-(1-methylethyl)-1-(1*H*-1,2,4-triazol-1-ylmethyl) cyclopentanol
CAS #	125225-28-7
End-use product/EP	Vortex™ Seed Treatment Fungicide (EPA Reg. No. 7501-ROL); liquid formulation containing 40.7% ipconazole, 9.26 lb/gallon bulk density (3.77 lb ai/gallon).

The physical and chemical properties of ipconazole were submitted by the registrant as part of the product chemistry data. These data appear in MRID numbers 45542201 through 45542220. They have been reviewed by the Registration Division (RD) and are summarized in Memo, D292379, S. Mather, 11/24/03.

TABLE 2. Physicochemical Properties of the Technical Grade Test Compound.

Parameter	Value	
Melting point/range	85-88°C	
pH	5.35 (1% Suspension at 25°C)	
Density	1.2 g/mL at 20°C	
Water solubility	cis-cis isomer: 9 ppm cis-trans isomer: 5 ppm	
Solvent solubility in g/L	Acetone	570
	1,2 Dichloroethane	420
	Dichloromethane	580
	Ethyl Acetate	430

TABLE 2. Physicochemical Properties of the Technical Grade Test Compound.		
Parameter	Value	
	Heptane	1.9
	Methanol	680
	n-Octanol	230
	Toluene	160
	Xylenes	150
Vapor pressure	<5.0 x 10^{-5} Pa (at both 20 and 30°C)	
Dissociation constant, pK_a	Could not be measured	
Octanol/water partition coefficient, Log(K_{ow})	cis-cis isomer: 4.6 cis-trans isomer: 4.4	
UV/visible absorption spectrum	222 nm: 0.74541 (Absorption AUS) 268 nm: 0.02653 (Absorption AUS)	

860.1200 Directions for Use

The registrant provided a copy of the end-use product label for a liquid formulation containing 40.7% ipconazole (Vortex™ Seed Treatment Fungicide, EPA Reg. No. 7501-ROL). Table 3 provides a summary of the proposed uses of ipconazole as a seed treatment on root and tuber vegetables, leafy vegetables (except Brassica vegetables), Brassica (cole) leafy vegetables, cucurbit vegetables, cereal grains including forage and silage, grass (forage, fodder, and hay), nongrass animal feeds (forage, fodder, straw, and hay), cotton, sunflower, mustard, rape, and canola.

Table 3. Summary of Directions for Seed Treatment Use of Ipconazole on Agricultural Crops.			
Application Rate	Max. No. Applic. per Season	Maximum Seasonal Application Rate	Use Directions and Limitations
Root and Tuber Vegetables [including arracacha, arrowroot, artichoke, artichoke (Chinese), artichoke (Jerusalem), beet (garden), beet (sugar), burdock (edible), canna (edible), carrot, cassava (bitter and sweet), celeriac (celery root), chayote (root), chervil (turnip-rooted), chicory, chufa, dasheen (taro), ginger, ginseng, horseradish, leren, parsley (turnip-rooted), parsnip, potato, radish, radish (oriental), rutabaga, salsify, salsify (black), salsify (Spanish), skirret, sweet potato, tanier, turmeric, turnip, yam bean (jicama, manioc pea) and yam (true)]			
0.0015-0.0025 lb ai/100 lbs of seed or propagating root or tuber material	1	0.0015-0.0025 lb ai/100 lbs of seed or propagating root or tuber material	For protection against seed-borne and soil-borne fungi which cause seed decay, damping-off, and seedling blight.
Leafy Vegetables (Except Brassica Vegetables) [including amaranth (leafy, Chinese spinach, tampala), arugula, cardoon, celery (including Chinese), celtuce, chervil, chrysanthemum (edible-leaved and garland), corn salad, cress (garden and upland), dandelion, dock, endive, fennel (Florence)(finochio), lettuce (head and leaf), orach, parsley, purslane (garden and winter), radicchio, rhubarb, spinach, spinach (New Zealand), spinach (vine), and Swiss chard]			

Table 3. Summary of Directions for Seed Treatment Use of Ipconazole on Agricultural Crops.			
Application Rate	Max. No. Applic. per Season	Maximum Seasonal Application Rate	Use Directions and Limitations
0.0015-0.0025 lb ai/100 lbs of seed	1	0.0015-0.0025 lb ai/100 lbs of seed	For protection against seed-borne and soil-borne fungi which cause seed decay, damping-off, and seedling blight.
Brassica (Cole) Leafy Vegetables [including broccoli, broccoli (Chinese), broccoli (raab), Brussels sprouts, cabbage (including Chinese bok choy, Chinese napa, and Chinese mustard), cauliflower, cavalo broccoli, collards, kale, kohlrabi, mizuna, mustard greens, mustard spinach, and rape greens]			
0.0015-0.0025 lb ai/100 lbs of seed	1	0.0015-0.0025 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight.
Cucurbit Vegetables [including chayote, Chinese waxgourd, citron melon, cucumber, gherkin, gourd edible (includes hyotan, cucuzza, hechima, Chinese okra), momordica, all muskmelon, pumpkin, squash, and watermelon]			
0.0015-0.0025 lb ai/100 lbs of seed	1	0.0015-0.0025 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight.
Cereal Grains (Including Forage and Silage) [including corn (field corn , popcorn, and sweet corn), millet (pearl and proso), oats, rice, rye, and sorghum]			
Corn (field corn and popcorn): 0.0013-0.0015 lb ai/100 lbs of seed	1	0.0013-0.0015 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight. May be tank mixed with Allegiance® FL Seed Treatment Fungicide (metalaxyl) for protection against *Pythium spp.*
Corn (sweet corn): 0.0013-0.0015 lb ai/100 lbs of seed	1	0.0013-0.0015 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight. May be tank mixed with Allegiance® FL Seed Treatment Fungicide (metalaxyl) for control of systemic downy mildew.
Sorghum, millet: 0.0015-0.0025 lb ai/100 lbs of seed	1	0.0015-0.0025 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight. May be tank mixed with Allegiance® FL Seed Treatment Fungicide (metalaxyl) to control damping-off due to *Pythium spp.* or systemic downy mildew.

Table 3. Summary of Directions for Seed Treatment Use of Ipconazole on Agricultural Crops.			
Application Rate	Max. No. Applic. per Season	Maximum Seasonal Application Rate	Use Directions and Limitations
Grass Forage, Fodder, and Hay [including all grasses (turfgrass, bermudagrass, bluegrass, and fescue or bromegrass), *Gramineae* family (either green or cured), except sugarcane and those included in the cereal grains group that will be fed to or grazed by livestock, all pasture and range grasses and grasses grown for hay or silage			
0.0015-0.0025 lb ai/100 lbs of seed or propagating root or tuber material	1	0.0015-0.0025 lb ai/100 lbs of seed or propagating root or tuber material	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight.
Nongrass Animal Feeds (Forage, Fodder, Straw, and Hay) [including alfalfa, bean (velveta, clover, kudzu, lespedeza, lupin, sainfoin, trefoil, vetch (including crown vetch and milk vetch)]			
0.0015-0.0025 lb ai/100 lbs of seed	1	0.0015-0.0025 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight.
Cotton			
0.0015-0.0025 lb ai/100 lbs of seed	1	0.0015-0.0025 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight.
Sunflower			
0.0015-0.0025 lb ai/100 lbs of seed	1	0.0015-0.0025 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight.
Mustard			
0.0015-0.010 lb ai/100 lbs of seed	1	0.0015-0.010 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight, as well as for protection against *Phoma lingam* causing blackleg.
Rape			
0.0015-0.010 lb ai/100 lbs of seed	1	0.0015-0.010 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight, as well as for protection against *Phoma lingam* causing blackleg.
Canola			
0.0015-0.010 lb ai/100 lbs of seed	1	0.0015-0.010 lb ai/100 lbs of seed	For protection against seedborne and soilborne fungi which cause seed decay, damping-off, and seedling blight, as well as for protection against *Phoma lingam* causing blackleg.

Application of Vortex™ Seed Treatment Fungicide may be made as a water-based slurry with other registered seed treatment insecticides and fungicides through standard slurry or mist-type commercial seed treatment equipment. The use of treated seed for feed, food, or oil purposes is prohibited. The general use directions specify a restricted entry interval (REI) of 24 hours. No rotational crop restrictions are specified on the label.

Conclusions. The proposed use directions are adequate to allow RAB2 to make an assessment of the equivalency of the proposed application rates with the application rates used in the radiotracer studies. As detailed earlier under "Residue Chemistry Deficiencies," label revisions are needed to ensure that all uses are non-food.

860.1300 Nature of the Residue - Plants

The registrant submitted several radiotracer studies from seed treatment conducted on various crops. These studies were initially screened to determine if uses were to be classified as either food or non-food based on the Agency's seed treatment policy. The results of studies conducted for canola, carrot, cotton, cucumber, leaf lettuce, and sorghum show that residues of ipconazole were below 5 ppb at the respective seed treatment rates used in the individual studies. As a result, these studies are adequate to classify the proposed seed treatment uses of ipconazole on these crops as non-food uses. DERs of studies submitted for these crops were prepared. A DER was also prepared for the corn study because only one of the corn commodities (mature corn seed) had a residue level that exceeded 5 ppb. The residue level in this commodity was 5.5 ppb. If the registrant reduces the maximum application rate from 0.0015 lb ai/100 lbs of seed to 0.0013 lb ai/100 lbs of seed, then HED will consider the proposed use to be a non-food use. The application rate used in the study was 0.00147 lb ai/100 lbs seed and the residue level was 5.5 ppb. Assuming a linear relationship between application rate and residue level, if the application rate used in the study had been 0.0013 rather than 0.00147 lb ai/100 lbs of seed, the residue level would have been 4.7 ppb.

The radiotracer studies conducted on soybean and wheat were not reviewed because the data showed that seed treatment uses on these crops should be classified as food uses requiring tolerances. In addition, the registrant submitted a soybean and wheat metabolism study (MRID 45542248) where select samples of soybean and wheat RACs from the original radiotracer studies were subjected to residue characterization and identification. Because the TRR from the radiotracer studies on soybean and wheat were >5 ppb, which demonstrated uptake of residues, these uses must be considered food uses requiring tolerances.

Prior to generation of their data, Gustafson discussed the site of the ^{14}C radiolabel with HED (aforementioned meetings with R. Loranger). At that time it was agreed that, provided uptake of activity from the triazole ring labeled ipconazole was greater than that from benzyl ring labeled compound in the wheat and soybean studies, the use of just the triazole label in the other crops would be acceptable. Although HED has not generated DERs for the wheat and soybean studies, examination of those data confirmed that uptake of the triazole label was significantly higher than that of the benzyl label in all the wheat and soybean RAC's. TRR's from the benzyl label

were all <2 ppb except for wheat straw at the highest application rate where the total residue was 5.1 ppb. Therefore, use of only the triazole labeled ipconazole in the other studies is acceptable.

Canola

45542247.DER.wpd

Gustafson LLC has submitted a canola radiotracer study performed for the purpose of determining residue levels in canola treated with ipconazole. Canola seeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 66,555 dpm/µg) at 0.00186, 0.00295, and 0.01086 lb ai/100 lbs of seed. Treated and untreated canola seeds were planted and grown according to appropriate agronomic practices. Mature canola was cut 206 days after planting (DAP) and allowed to dry for 9 days prior to threshing. Canola seed (grain) samples were collected after threshing. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC), and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

TRR in mature canola seed grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00186, 0.00295, and 0.01086 lb ai/100 lbs of seed were 0.57-0.81, 0.83-1.10, and 4.60-4.78 ppb, respectively. No further work was performed to identify or further characterize the radioactivity in canola seed.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that canola seed samples were stored for a maximum of 52 days from harvest to analysis. As a result, no storage stability data are required because samples were stored frozen for less than six months.

Carrot

45542245.DER.wpd

Gustafson LLC has submitted a carrot radiotracer study performed for the purpose of determining residue levels in carrots grown from seeds treated with ipconazole. Carrot seeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 68,030 dpm/µg) at 0.00236 and 0.00928 lb ai/100 lbs of seed. Treated and untreated carrot seeds were planted and grown according to appropriate agronomic practices. Mature carrots were harvested 85 days after planting and separated into carrot tops and roots. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC), and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

TRR in mature carrot tops grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00236 and 0.00928 lb ai/100 lbs of seed were 0.32-0.49 and 0.56-0.87 ppb, respectively. TRR in carrot roots grown from seeds treated at these same levels were nondetectable (i.e., average dpm/g in samples was below that of the unfortified control sample)

and 0.10-0.32 ppb, respectively. No further work was performed to identify or further characterize the radioactivity in carrot tops and roots.

Samples were stored for 15 days from harvest to analysis. As samples were stored for less than six months, no storage stability data are required .

Corn

45542241.DER.wpd

Gustafson LLC has submitted a corn radiotracer study performed for the purpose of determining residue levels in corn grown from treated seed. Corn seed was treated with [triazole-3,5-^{14}C]ipconazole (specific activity 64,957 dpm/µg) at the following three treatment levels: 0.00147, 0.00231, and 0.01061 lb ai/100 lbs of seed. Treated and untreated corn seeds were planted and grown according to appropriate agronomic practices. Kernels plus cobs with husks removed (K+CWHR) were collected 85 days after planting (DAP), forage samples were collected 93 DAP, and both stover and mature corn seed were harvested 135 days after planting. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC) and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

TRR were below 5 ppb in forage, K+CWHR, and stover grown from seed treated with [triazole-3,5-^{14}C]ipconazole at the lower treatment levels of 0.00147 and 0.00231 lb ai/100 lbs of seed. TRR were above 5 ppb in these same commodities (forage, K+CWHR, and stover) grown from seed treated at the highest level of 0.01061 lb ai/100 lbs of seed. TRR were also above 5 ppb in mature corn seed grown from seed treated at all three treatment levels. The residue level in mature corn seed grown from seed treated at the lowest level (0.00147 lb ai/100 lbs of seed) was 5.50 ppb. No further work was performed to identify or further characterize the radioactivity in any of the corn commodities.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than two months from harvest to analysis. As a result, no storage stability data are required.

The registrant needs to submit a revised label that specifies a maximum application rate for corn of 0.0013 lb ai/100 lbs of seed.

Cotton

45542239.DER.wpd

Gustafson LLC has submitted a cotton radiotracer study performed for the purpose of determining residue levels in cotton grown from treated seed. Cottonseeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 64,957 dpm/µg) at 0.00253, 0.00530, 0.01076, and 0.02645 lb ai/100 lbs of seed. Treated and untreated cottonseeds were planted and grown

according to appropriate agronomic practices. Mature cotton was harvested 140 days after planting. Cotton lint was ginned and the seed was retained. The remaining aerial portion of the plants was cut and retained as simulated gin byproduct samples. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC) and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

TRR in mature cottonseed grown from seed treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00253, 0.00530, 0.01076, and 0.02645 lb ai/100 lbs of seed were 3.65, 7.96, 17.00, and 37.15 ppb, respectively. TRR in cotton gin byproducts grown from seed treated at the same treatment levels were 0.68, 1.32, 2.59, and 4.26 ppb, respectively. No further work was performed to identify or further characterize the radioactivity in cottonseed or cotton gin byproducts.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than one month from harvest to analysis. As a result, no storage stability data are required.

Cucumber

45542242.DER.wpd

Gustafson LLC has submitted a cucumber radiotracer study performed for the purpose of determining residue levels in cucumber grown from seed treated with ipconazole. Cucumber seeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 68,030 dpm/μg) at levels of 0.00241 and 0.00929 lb ai/100 lbs of seed. Treated and untreated cucumber seeds were planted and grown according to appropriate agronomic practices. Mature cucumbers were harvested 87 days after planting. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC), and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

TRR were <5 ppb in mature cucumbers grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00241 and 0.00929 lb ai/100 lbs of seed. No further work was performed to identify or further characterize the radioactivity in cucumbers.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than one month from harvest to analysis. As a result, no storage stability data are required.

Leaf Lettuce

45542244.DER.wpd

Gustafson LLC has submitted a leaf lettuce radiotracer study performed for the purpose of determining residue levels in lettuce grown from treated seed. Leaf lettuce seeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 68,030 dpm/μg) at 0.00255 and 0.00965 lb

ai/100 lbs of seed. Treated and untreated leaf lettuce seeds were planted and grown according to appropriate agronomic practices. Mature leaf lettuce was harvested 65 days after planting. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC), and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

TRR were below 5 ppb (non-detectable to 0.50 ppb) in mature leaf lettuce grown from seed treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00255 and 0.00965 lb ai/100 lbs of seed. No further work was performed to identify or further characterize the radioactivity in leaf lettuce.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than one month from harvest to analysis. As a result, no storage stability data are required.

Sorghum

45542240.DER.wpd

Gustafson LLC has submitted a sorghum radiotracer study performed for the purpose of determining residue levels in sorghum grown from treated seed. Sorghum seeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 66,285 dpm/μg) at 0.00159, 0.00264, and 0.01118 lb ai/100 lbs of seed. Treated and untreated sorghum seeds were planted and grown according to appropriate agronomic practices. Sorghum forage was harvested 73 days after planting (DAP). Mature sorghum was cut 115 DAP, and sorghum grain was collected. The stover was allowed to dry in the field/greenhouse for 21 days prior to collection. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC), and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

TRR in sorghum forage grown from seed treated with [triazole-3,5-^{14}C]ipconazole at levels of 0.00159, 0.00264, and 0.01118 lb ai/100 lbs of seed were 0.38, 0.56, and 1.30 ppb, respectively. TRR in sorghum grain grown from seed treated at the same levels were 0.71, 0.53, and 2.13 ppb, respectively, and TRR in stover were 0.27, 0.42, and 0.98 ppb, respectively. No further work was performed to identify or further characterize the radioactivity in sorghum forage, grain, and stover.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that sorghum forage samples were stored for 69 days, and sorghum grain and stover samples were stored 27 days from harvest to analysis. As a result, no storage stability data are required because samples were stored frozen for less than six months.

860.1300 Nature of the Residue - Livestock

Data pertaining to this guideline topic are not required for the registration of non-food uses.

860.1340 Residue Analytical Methods

Data pertaining to this guideline topic are not required for the registration of non-food uses.

860.1360 Multiresidue Methods

Data pertaining to this guideline topic are not required for the registration of non-food uses.

860.1380 Storage Stability

In all reviewed studies, samples were stored for less than six months from the time of harvest to the time of analysis. As a result, no storage stability data are required for these radiolabeled uptake studies.

860.1400 Water, Fish, and Irrigated Crops

Data pertaining to this guideline topic are not required for the registration of non-food uses.

860.1460 Food Handling

Data pertaining to this guideline topic are not required for the registration of non-food uses.

860.1480 Meat, Milk, Poultry, and Eggs

Data pertaining to this guideline topic are not required for the registration of non-food uses.

860.1500 Crop Field Trials

Data pertaining to this guideline topic are not required for the registration of the uses which HED considers non-food because radiolabeled studies are available demonstrating <5 ppb total uptake of residues.

860.1520 Processed Food and Feed

Data pertaining to this guideline topic are not required for the registration of non-food uses.

860.1850 Confined Accumulation in Rotational Crops

Data pertaining to this guideline topic are not required for the registration of non-food uses.

860.1900 Field Accumulation in Rotational Crops

Data pertaining to this guideline topic are not required for the registration of non-food uses.

860.1550 Proposed Tolerances

There are currently no established Codex, Canadian, or Mexican MRLs for ipconazole. An International Residue Limit Status sheet is attached to this review.

860.1650 Submittal of Analytical Reference Standards

An analytical reference standard for ipconazole is available at the EPA National Pesticide Standards Repository (Source: 12/4/03 e-mail correspondence between T. Cowen of Dynamac and P. Schermerhorn of EPA).

Attachments:
International Residue Limit Status sheet

INTERNATIONAL RESIDUE LIMIT STATUS

Chemical Name: 2-[(4-chlorophenyl)methyl]-5-(1-methylethyl)-1-(1*H*-1,2,4-triazol-1-ylmethyl) cyclopentanol	Common Name: Ipconazole	☐ Proposed tolerance ☐ Reevaluated tolerance ☐ Other	Date: 12/03

Codex Status (Maximum Residue Limits)	U. S. Tolerances
X No Codex proposal step 6 or above ☐ No Codex proposal step 6 or above for the crops requested	Petition Number: None DP Barcode: D289092 Other Identifier:
Residue definition (step 8/CXL): N/A	Reviewer/Branch: D. Dotson/ RAB2
	Residue definition: Not established

Crop (s)	MRL (mg/kg)	Crop(s)	Tolerance (ppm)

Limits for Canada	Limits for Mexico
X No Limits ☐ No Limits for the crops requested	X No Limits ☐ No Limits for the crops requested
Residue definition: N/A	Residue definition: N/A

Crop(s)	MRL (mg/kg)	Crop(s)	MRL (mg/kg)

Notes/Special Instructions: S. Funk, 12/03/2003.

Rev. 1998

Ipconazole/7501-ROL/125618/Gustafson LLC/7501
DACO 6.3/OPPTS 860.1300/OECD II 6.2.2, 6.2.3 & IIIA 8.2, 8.4.1, 8.4.2
Radiotracer Study - Corn

D. Dotson

Primary Evaluator Douglas Dotson, Chemist, HED/RAB2 Date: 4/23/2004

Peer Reviewer William Drew, Chemist, HED/RAB2 Date: 4/23/2004

STUDY REPORT:

45542241 Fathulla, R. (2001) Determination of the Total Radioactive Residues of ^{14}C-labeled Ipconazole in Corn: Lab Study Number: 6456-120. Unpublished study prepared by Covance Laboratories Inc. 101 p.

EXECUTIVE SUMMARY:

Gustafson LLC has submitted a corn radiotracer study performed for the purpose of determining residue levels in corn grown from treated seed. Corn seed was treated with [triazole-3,5-^{14}C]ipconazole (specific activity 64,957 dpm/µg) at the following three treatment levels: 0.00147, 0.00231, and 0.01061 lb ai/100 lbs of seed. Treated and untreated corn seeds were planted and grown according to appropriate agronomic practices. Kernels plus cobs with husks removed (K+CWHR) were collected 85 days after planting (DAP), forage samples were collected 93 DAP, and both stover and mature corn seed were harvested 135 days after planting. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC) and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

Total radioactive residues (TRR) were below 5 ppb in forage, K+CWHR, and stover grown from seed treated with [triazole-3,5-^{14}C]ipconazole at the lower treatment levels of 0.00147 and 0.00231 lb ai/100 lbs of seed. TRR were above 5 ppb in these same commodities (forage, K+CWHR, and stover) grown from seed treated at the highest level of 0.01061 lb ai/100 lbs of seed. TRR were also above 5 ppb in mature corn seed grown from seed treated at all three treatment levels. The residue level in mature corn seed grown from seed treated at the lowest level (0.00147 lb ai/100 lbs of seed) was 5.50 ppb. No further work was performed to identify or further characterize the radioactivity in any of the corn commodities.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than two months from harvest to analysis. As a result, no storage stability data are required.

STUDY/WAIVER ACCEPTABILITY/DEFICIENCIES/CLARIFICATIONS:

Under the conditions and parameters used in the radiotracer study, the corn residue data are classified as scientifically acceptable. The acceptability of this study for regulatory purposes is addressed in the forthcoming U.S. EPA Residue Chemistry Summary Document (DP Barcode D289092).

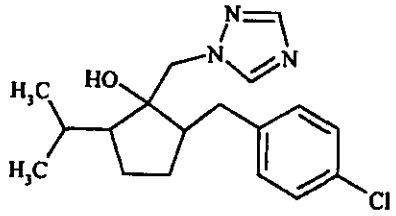
COMPLIANCE:

Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. The registrant reported that the minor deviations that were made did not impact the validity of the study.

A. BACKGROUND INFORMATION

Ipconazole is a new chemical proposed for seed treatment use on various crops. It is a systemic, broad-spectrum fungicide seed dressing used to protect plants from soil-borne and seed-borne disease.

TABLE A.1. Test Compound Nomenclature.

Compound	
Common name	Ipconazole
Company experimental name	None specified
IUPAC name	(1*RS*, 2*SR*, 5*RS*; 1*RS*, 2*SR*, 5*SR*)-2-(4-chlorobenzyl)-5-isopropyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
CAS name	2-[(4-chlorophenyl)methyl]-5-(1-methylethyl)-1-(1*H*-1,2,4-triazol-1-ylmethyl) cyclopentanol
CAS #	125225-28-7
End-use product/EP	Vortex™ Seed Treatment Fungicide (EPA Reg. No. 7501-ROL); liquid formulation containing 40.7% ipconazole, 9.26 lb/gallon bulk density (3.77 lb ai/gallon)

The physical and chemical properties of ipconazole were submitted by the registrant as part of the product chemistry data. These data appear in MRID numbers 45542201 through 45542220. They have been reviewed by the Registration Division (RD) and are summarized in Memo, D292379, S. Mather, 11/24/03.

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TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound.		
Parameter	Value	
Melting point/range	85-88°C	
pH	5.35 (1% Suspension at 25°C)	
Density	1.2 g/mL at 20°C	
Water solubility	cis-cis isomer: 9 ppm cis-trans isomer: 5 ppm	
Solvent solubility in g/L	Acetone	570
	1,2 Dichloroethane	420
	Dichloromethane	580
	Ethyl Acetate	430
	Heptane	1.9
	Methanol	680
	n-Octanol	230
	Toluene	160
	Xylenes	150
Vapor pressure	<5.0 x 10^{-5} Pa (at both 20 and 30°C)	
Dissociation constant, pK_a	Could not be measured	
Octanol/water partition coefficient, $Log(K_{ow})$	cis-cis isomer: 4.6 cis-trans isomer: 4.4	
UV/visible absorption spectrum	222 nm: 0.74541 (Absorption AUS) 268 nm: 0.02653 (Absorption AUS)	

B. EXPERIMENTAL DESIGN

B.1. Test Site and Crop Information

TABLE B.1.1. Test Site Information				
Testing Environment	Soil characteristics			
	Type	%OM	pH	CEC (meq/100 g)
Five outdoor test plots (3'x7' each), laterally confined using a buried board perimeter and surrounded by protective fences.	Sandy loam	1.7	6.2	4.4

The study submission provided temperature and rainfall data that were taken during the biological phase of the study (May - September 1999). The study also included historical weather data (1989-1998). No meteorological abnormalities were reported by the registrant for the study period. Information pertaining to the test crop is presented below in Table B.1.2.

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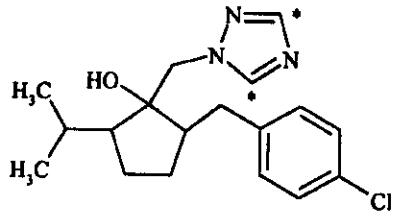
TABLE B.1.2. Crop Information.					
Crop/ Crop Group	Variety	Growth stage at application	Growth stage at harvest	Harvested RAC	Harvesting procedure
Corn/ Cereal Grains	Pioneer 3394	Seed treatment	Milk Stage (85 DAP)	K+CWHR	Hand harvested
			Soft Dough, Very Early Dent Stage (93 DAP)	Forage	Hand harvested
			135 DAP	Mature seed, stover	Hand harvested. Grain: hand shelled.

B.2. Test Materials

TABLE B.2.1. Test Material Characteristics	
Chemical structure	
Radiolabel position	Labeled on the 3C and 5C positions of the triazole ring
Lot No.	Not available
Purity	>99% (HPLC and TLC)
Specific activity [1]	56 mCi/mmol 370,331 dpm/µg (before dilution with nonlabeled ipconazole) 64,127 dpm/µg (after dilution)
Code	CFQ10973

[1]The radiolabeled substance was isotopically diluted with nonlabeled ipconazole formulated as a wettable powder (WP).

B.3. Study Use Pattern

TABLE B.3.1. Use Pattern Information	
Chemical name	triazole-3,5-^{14}C-ipconazole
Application method	The isotopically diluted test substance, formulated as a WP formulation, was homogenized in ethanol:water (1:1, v:v). Corn seeds were shaken in a jar with the test substance at Covance Laboratories. Treated seeds were then shipped to American Agricultural Services, Inc.
Application rate	Treatment plot 1: Non-treated seed (control) Treatment plot 2: 0.00147 lb ai/100 lbs of seed Treatment plot 3: 0.00231 lb ai/100 lbs of seed Treatment plot 4: 0.01061 lb ai/100 lbs of seed
Number of applications	One
Timing of applications	Seed treatment
PHI	Not applicable, seed treatment

B.4. Identification/Characterization of Residues

B.4.1. Sample Handling and Preparation

One sample for each RAC for each treatment was collected after harvest. K+CWHR were collected on August 5, 1999 (85 DAP). Forage samples were collected on August 13,1999 at the soft dough/early dent stage (93 DAP). The mature corn was harvested September 24, 1999 (135 DAP). All samples were maintained frozen until shipment to Covance Laboratories. Immature harvest corn forage and K+CWHR (all treatment levels) were shipped to Covance on August 16, 1999. The mature grain and stover samples were shipped to Covance on September 27, 1999. Samples were shipped frozen, and were received by Covance frozen and in good condition.

B.4.2. Analytical Methodology

Total radioactive residues (TRR) were determined by combustion followed by liquid scintillation counting (LSC) of triplicate aliquots of homogenized K+CWHR, forage, stover, and mature corn seed. Triplicate aliquots of an unfortified control sample were also analyzed. No further work was performed to identify or further characterize the radioactivity in the corn commodities.

C. RESULTS AND DISCUSSION

C.1. Storage Stability

Field samples were maintained frozen at the field facility and shipped frozen to Covance Laboratories, Inc. (Madison, WI) for analysis. Actual analysis dates (i.e., dates of the LSC) were not provided. Based on the analytical termination date, however, it can be concluded that all samples were stored for less than two months from harvest to analysis. As the samples were stored for less than six months, no storage stability data are required. The storage conditions for the corn radiotracer study are presented in Table C.1.1.

TABLE C.1.1. Summary of Storage Conditions.

Matrix (RAC or Extract)	Storage Temp. (°C)	Actual Study Duration	Interval of Demonstrated Storage Stability
K+CWHR	-10 to -30	Actual analysis dates were not reported; however, based on the analytical termination date, samples were stored for up to 57 days (<2 months) from harvest to LSC analysis.	No storage stability data are required.
Forage			
Stover			
Mature Seed			

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C.2. Identification, Characterization, and Distribution of Residues

TRR in corn commodities grown from seed treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00147, 0.00231, and 0.01061 lb ai/100 lbs of seed were as follows: K+CWHR (1.73, 2.18, and 5.79 ppb, respectively), forage (1.25, 1.78, and 6.35 ppb, respectively), stover (1.17, 1.59, and 6.36 ppb, respectively), and mature corn seed (5.50, 9.67, and 24.42 ppb, respectively). No further work was performed to identify or further characterize the radioactivity in the corn commodities. TRR in the various corn commodities are reported in Table C.2.1.

TABLE C.2.1. Total Radioactive Residues (TRR) in Corn Commodities

Treatment Rate	Timing and Applic. No.	PHI (days)	Residues in K+CWHR (ppb)	Residues in Forage (ppb)	Residues in Stover (ppb)	Residues in Mature Seed (ppb)
Treatment 2: 0.00147 lb ai/100 lbs of seed	Single seed treatment	NA	1.73	1.25	1.17	5.50
Treatment 3: 0.00231 lb ai/100 lbs of seed	Single seed treatment	NA	2.18	1.78	1.59	9.67
Treatment 4: 0.01061 lb ai/100 lbs of seed	Single seed treatment	NA	5.79	6.35	6.36	24.42

NA: Not Applicable

C.3. Proposed Metabolic Profile

Besides determining the levels of radioactivity in the various corn commodities, the registrant reported no further attempts to identify or further characterize the radioactivity.

D. CONCLUSION

Total radioactive residues (TRR) were below 5 ppb in forage, K+CWHR, and stover grown from seed treated with [triazole-3,5-^{14}C]ipconazole at the lower treatment levels of 0.00147 and 0.00231 lb ai/100 lbs of seed. TRR were above 5 ppb in these same commodities (forage, K+CWHR, and stover) grown from seed treated at the highest level of 0.01061 lb ai/100 lbs of seed. TRR were also above 5 ppb in mature corn seed grown from seed treated at all three treatment levels. The residue level in mature corn seed grown from seed treated at the lowest level (0.00147 lb ai/100 lbs of seed) was 5.50 ppb. No further work was performed to identify or further characterize the radioactivity in any of the corn commodities.

E. REFERENCES

None.

F. DOCUMENT TRACKING

Petition Number: None (non-food use)
DP Barcode: D289092
PC Code: 125618

Ipconazole/7501-ROL/125618/Gustafson LLC/7501
DACO 6.3/OPPTS 860.1300/OECD II 6.2.2, 6.2.3 & IIIA 8.2, 8.4.1, 8.4.2
Radiotracer Study - Cotton

Primary Evaluator	D. Dotson Douglas Dotson, Chemist, HED/RAB2	Date: 4/23/2004
Peer Reviewer	W H Drew William Drew, Chemist, HED/RAB2	Date: 4/23/2004

This DER was originally prepared under contract by Dynamac Corporation (20440 Century Boulevard, Suite 100; Germantown, MD 20874; submitted 01/09/2004). The DER has been reviewed by the HED and revised to reflect current OPP policies.

STUDY REPORT:

45542239 Fathulla, R. (2001) Determination of the Total Radioactive Residues of ^{14}C-labeled Ipconazole in Cotton: Lab Study Number: revised 6456-121. Unpublished study prepared by Covance Laboratories Inc. 101 p.

EXECUTIVE SUMMARY:

Gustafson LLC has submitted a cotton radiotracer study performed for the purpose of determining residue levels in cotton grown from treated seed. Cottonseeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 64,957 dpm/µg) at 0.00253, 0.00530, 0.01076, and 0.02645 lb ai/100 lbs of seed. Treated and untreated cottonseeds were planted and grown according to appropriate agronomic practices. Mature cotton was harvested 140 days after planting. Cotton lint was ginned and the seed was retained. The remaining aerial portions of the plants were cut and retained as simulated gin byproduct samples. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC) and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

Total radioactive residues (TRR) in mature cottonseed grown from seed treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00253, 0.00530, 0.01076, and 0.02645 lb ai/100 lbs of seed were 3.65, 7.96, 17.00, and 37.15 ppb, respectively. TRR in cotton gin byproducts grown from seed treated at the same treatment levels were 0.68, 1.32, 2.59, and 4.26 ppb, respectively. No further work was performed to identify or further characterize the radioactivity in cottonseed or cotton gin byproducts.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than one month from harvest to analysis. As a result, no storage stability data are required.

STUDY/WAIVER ACCEPTABILITY/DEFICIENCIES/CLARIFICATIONS:

Under the conditions and parameters used in the radiotracer study, the cottonseed and cotton gin byproducts residue data are classified as scientifically acceptable. The acceptability of this study for regulatory purposes is addressed in the forthcoming U.S. EPA Residue Chemistry Summary Document (DP Barcode D289092).

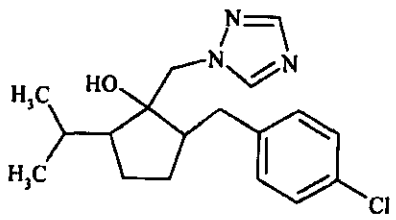
COMPLIANCE:

Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. The registrant did not report that the investigators made any deviations from regulatory requirements that would have an impact on the validity of the study.

A. BACKGROUND INFORMATION

Ipconazole is a new chemical proposed for seed treatment use on various crops. Ipconazole is a systemic broad spectrum fungicide seed dressing used to protect plants from soil borne and seed borne disease.

TABLE A.1. Test Compound Nomenclature.

Compound	
Common name	Ipconazole
Company experimental name	None specified
IUPAC name	(1*RS*, 2*SR*, 5*RS*; 1*RS*, 2*SR*, 5*SR*)-2-(4-chlorobenzyl)-5-isopropyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
CAS name	2-[(4-chlorophenyl)methyl]-5-(1-methylethyl)-1-(1*H*-1,2,4-triazol-1-ylmethyl) cyclopentanol
CAS #	125225-28-7
End-use product/EP	Vortex™ Seed Treatment Fungicide (EPA Reg. No. 7501-ROL); liquid formulation containing 40.7% ipconazole, 9.26 lb/gallon bulk density (3.77 lb ai/gallon)

The physical and chemical properties of ipconazole were submitted by the registrant as part of the product chemistry data. These data appear in MRID numbers 45542201 through 45542220. They have been reviewed by the Registration Division (RD) and are summarized in Memo, D292379, S. Mather, 11/24/03.

TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound.		
Parameter	Value	
Melting point/range	85-88°C	
pH	5.35 (1% Suspension at 25°C)	
Density	1.2 g/mL at 20°C	
Water solubility	cis-cis isomer: 9 ppm cis-trans isomer: 5 ppm	
Solvent solubility in g/L	Acetone	570
	1,2 Dichloroethane	420
	Dichloromethane	580
	Ethyl Acetate	430
	Heptane	1.9
	Methanol	680
	n-Octanol	230
	Toluene	160
	Xylenes	150
Vapor pressure	<5.0 x 10^{-5} Pa (at both 20 and 30°C)	
Dissociation constant, pK_a	Could not be measured	
Octanol/water partition coefficient, Log(K_{ow})	cis-cis isomer: 4.6 cis-trans isomer: 4.4	
UV/visible absorption spectrum	222 nm: 0.74541 (Absorption AUS) 268 nm: 0.02653 (Absorption AUS)	

B. EXPERIMENTAL DESIGN

B.1. Test Site and Crop Information

TABLE B.1.1. Test Site Information				
Testing Environment	Soil characteristics			
	Type	%OM	pH	CEC (meq/100 g)
Five outdoor test plots (3'x7' each), laterally confined using a buried board perimeter and surrounded by protective fences.	Sandy loam	1.5	5.8	4.9

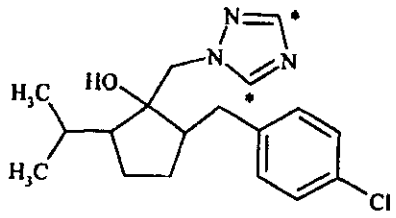
The study submission provided temperature and rainfall data that were taken during the biological phase of the study (May - October 1999). The study also included historical weather data (1989-1998). No meteorological abnormalities were reported by the registrant for the study period. Information pertaining to the test crop is presented below in Table B.1.2.

TABLE B.1.2. Crop Information.

Crop/ Crop Group	Variety	Growth stage at application	Growth stage at harvest	Harvested RAC	Harvesting procedure
Cotton/ Miscellaneous Commodity	DP 436RR	Seed treatment	Mature	Cottonseed and cotton gin byproducts	Mature cotton was harvested by hand 140 days after planting.

B.2. Test Materials

TABLE B.2.1. Test Material Characteristics

Chemical structure	
Radiolabel position	Labeled on the 3C and 5C positions of the triazole ring
Lot No.	Not available
Purity	>99% (HPLC and TLC)
Specific activity [1]	56 mCi/mmol 370,331 dpm/µg (before dilution with nonlabeled ipconazole) 64,957 dpm/µg (after dilution)
Code	CFQ10973

[1]The radiolabeled substance was isotopically diluted with nonlabeled ipconazole formulated as a wettable powder (WP).

B.3. Study Use Pattern

TABLE B.3.1. Use Pattern Information

Chemical name	triazole-3,5-^{14}C-ipconazole
Application method	The isotopically diluted test substance, formulated as a WP formulation, was homogenized in ethanol:water (1:1, v:v). Cotton seeds were shaken in a jar with the test substance at Covance Laboratories. Treated seeds were then shipped to American Agricultural Services, Inc.
Application rate	Treatment plot 1: Non-treated seed (control) Treatment plot 2: 0.00253 lb ai/100 lbs of seed Treatment plot 3: 0.00530 lb ai/100 lbs of seed Treatment plot 4: 0.01076 lb ai/100 lbs of seed Treatment plot 5: 0.02645 lb ai/100 lbs of seed
Number of applications	One
Timing of applications	Seed treatment
PHI	Not applicable, seed treatment

B.4. Identification/Characterization of Residues

B.4.1. Sample Handling and Preparation

Mature cotton lint was ginned and the seed was retained. The remaining aerial portions of the plants were cut and retained as simulated gin byproduct samples. Samples of cottonseed and cotton gin byproducts were frozen at the field site and shipped frozen to Covance Laboratories (Madison, WI) for further processing.

B.4.2. Analytical Methodology

Total radioactive residues (TRR) were determined by combustion followed by liquid scintillation counting (LSC) of triplicate aliquots of homogenized cottonseed and cotton gin byproducts. Triplicate aliquots of an unfortified control sample were also analyzed. No further work was performed to identify or further characterize the radioactivity in cottonseed or cotton gin byproducts.

C. RESULTS AND DISCUSSION

C.1. Storage Stability

Cotton gin byproducts and seed samples were frozen at the field facility and shipped frozen, within two days of harvest, to Covance Laboratories, Inc. (Madison, WI) for analysis. Actual analysis dates (i.e., dates of the LSC) were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than one month from harvest to analysis. As samples were stored for less than six months, no storage stability data are required. The storage conditions for the cotton radiotracer study are presented in Table C.1.1.

TABLE C.1.1. Summary of Storage Conditions.

Matrix (RAC or Extract)	Storage Temp. (°C)	Actual Study Duration	Interval of Demonstrated Storage Stability
Cottonseed	-10 to -30	Actual analysis dates were not reported; however, based on the analytical termination date, samples were stored for up to 7 days from harvest to LSC analysis.	No storage stability data are required.
Cotton gin byproducts			

C.2. Identification, Characterization, and Distribution of Residues

TRR in mature cottonseed grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00253, 0.00530, 0.01076, and 0.02645 lb ai/100 lbs of seed were 3.65, 7.96, 17.00, and 37.15 ppb, respectively. TRR in cotton gin byproducts grown from seeds treated at the same levels were 0.68, 1.32, 2.59, and 4.26 ppb, respectively. No further work was performed to identify or further characterize the radioactivity in cottonseed or cotton gin byproducts. TRR in cottonseed and cotton gin byproducts are reported in Table C.2.1.

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TABLE C.2.1. Total Radioactive Residues (TRR) in Cottonseed and Cotton Gin Byproducts.

Treatment Rate	Timing and Applic. No.	PHI (days)	Residues in Cottonseed (ppb)	Residues in Cotton Gin Byproducts (ppb)
Treatment 2: 0.00253 lb ai/100 lbs of seed	Single seed treatment	Not applicable (NA)	3.65	0.68
Treatment 3: 0.00530 lb ai/100 lbs of seed	Single seed treatment	NA	7.96	1.32
Treatment 4: 0.01076 lb ai/100 lbs of seed	Single seed treatment	NA	17.00	2.59
Treatment 5: 0.02645 lb ai/100 lbs of seed	Single seed treatment	NA	37.15	4.26

C.3. Proposed Metabolic Profile

No significant translocation of the radioactivity occurred in cottonseed and cotton gin byproducts from seed treatments with ipconazole at the lowest treatment rate.

D. CONCLUSION

The results of the radiotracer study on cotton show that the TRR were less than 5 ppb in mature cottonseed grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at the lowest treatment level: 0.00253 lb ai/100 lbs of seed. However, TRR were greater than 5 ppb (8-37 ppb) in cottonseed grown from seeds treated at the three higher treatment levels: 0.00530, 0.01076, and 0.02645 lb ai/100 lbs of seed. As for cotton gin byproducts, TRR levels were below 5 ppb in samples grown from seed treated at all four treatment levels. No significant translocation of the radioactivity occurred in cottonseed and cotton gin byproducts from seed treatments with ipconazole at the lowest treatment rate.

E. REFERENCES

None.

F. DOCUMENT TRACKING

Petition Number: None (non-food use)
DP Barcode: D289092
PC Code: 125618

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Ipconazole/7501-ROL/125618/Gustafson LLC/7501
DACO 6.3/OPPTS 860.1300/OECD II 6.2.2, 6.2.3 & IIIA 8.2, 8.4.1, 8.4.2
Radiotracer Study - Cucumber

Primary Evaluator	D. Dotson Douglas A. Dotson, Chemist, HED/RAB2	Date: 4/23/2004
Peer Reviewer	William Drew, Chemist, HED/RAB2	Date: 4/23/2004

This DER was originally prepared under contract by Dynamac Corporation (20440 Century Boulevard, Suite 100; Germantown, MD 20874; submitted 01/09/2004). The DER has been reviewed by the HED and revised to reflect current OPP policies.

STUDY REPORT:

45542242 Fathulla, R. (2001) Determination of the Total Radioactive Residues of ^{14}C-labeled Ipconazole in Cucumbers: Lab Study Number: 6456-119. Unpublished study prepared by Covance Laboratories Inc. 92 p.

EXECUTIVE SUMMARY:

Gustafson LLC has submitted a cucumber radiotracer study performed for the purpose of determining residue levels in cucumber grown from seed treated with ipconazole. Cucumber seeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 68,030 dpm/µg) at levels of 0.00241 and 0.00929 lb ai/100 lbs of seed. Treated and untreated cucumber seeds were planted and grown according to appropriate agronomic practices. Mature cucumbers were harvested 87 days after planting. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC), and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

Total radioactive residues (TRR) were <5 ppb in mature cucumbers grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00241 and 0.00929 lb ai/100 lbs of seed. No further work was performed to identify or further characterize the radioactivity in cucumbers.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than one month from harvest to analysis. As a result, no storage stability data are required.

STUDY/WAIVER ACCEPTABILITY/DEFICIENCIES/CLARIFICATIONS:

Under the conditions and parameters used in the radiotracer study, the cucumber residue data are classified as scientifically acceptable. The acceptability of this study for regulatory purposes is addressed in the forthcoming U.S. EPA Residue Chemistry Summary Document (DP Barcode D289092).

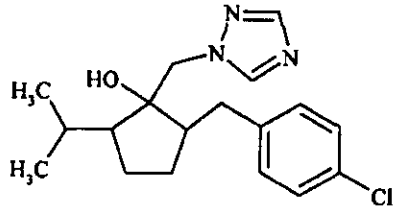
COMPLIANCE:

Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. The registrant did not report that the investigators made any deviations from regulatory requirements that would have an impact on the validity of the study.

A. BACKGROUND INFORMATION

Ipconazole is a new chemical proposed for seed treatment use on various crops. Ipconazole is a systemic broad spectrum fungicide seed dressing used to protect plants from soil borne and seed borne disease.

TABLE A.1. Test Compound Nomenclature.

Compound	
Common name	Ipconazole
Company experimental name	None specified
IUPAC name	(1*RS*, 2*SR*, 5*RS*; 1*RS*, 2*SR*, 5*SR*)-2-(4-chlorobenzyl)-5-isopropyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
CAS name	2-[(4-chlorophenyl)methyl]-5-(1-methylethyl)-1-(1*H*-1,2,4-triazol-1-ylmethyl) cyclopentanol
CAS #	125225-28-7
End-use product/EP	Vortex™ Seed Treatment Fungicide (EPA Reg. No. 7501-ROL); liquid formulation containing 40.7% ipconazole, 9.26 lbs/gallon bulk density (3.77 lb ai/gallon)

The physical and chemical properties of ipconazole were submitted by the registrant as part of the product chemistry data. These data appear in MRID numbers 45542201 through 45542220. They have been reviewed by the Registration Division (RD) and are summarized in Memo, D292379, S. Mather, 11/24/03.

TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound.

Parameter	Value	
Melting point/range	85-88°C	
pH	5.35 (1% Suspension at 25°C)	
Density	1.2 g/mL at 20°C	
Water solubility	cis-cis isomer: 9 ppm cis-trans isomer: 5 ppm	
Solvent solubility in g/L	Acetone	570
	1,2 Dichloroethane	420

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TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound.		
Parameter	Value	
	Dichloromethane	580
	Ethyl Acetate	430
	Heptane	1.9
	Methanol	680
	n-Octanol	230
	Toluene	160
	Xylenes	150
Vapor pressure	$<5.0 \times 10^{-5}$ Pa (at both 20 and 30°C)	
Dissociation constant, pK_a	Could not be measured	
Octanol/water partition coefficient, $Log(K_{OW})$	cis-cis isomer: 4.6 cis-trans isomer: 4.4	
UV/visible absorption spectrum	222 nm: 0.74541 (Absorption AUS) 268 nm: 0.02653 (Absorption AUS)	

B. EXPERIMENTAL DESIGN

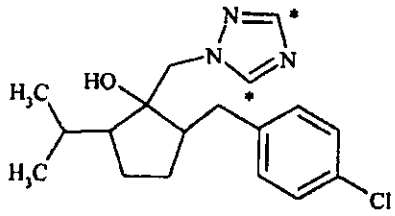
B.1. Test Site and Crop Information

TABLE B.1.1. Test Site Information				
Testing Environment	Soil characteristics			
	Type	%OM	pH	CEC (meq/100 g)
Three outdoor test plots (3'x7' each), laterally confined using a buried board perimeter and surrounded by protective fences.	Sandy loam	1.1	5.8	5.0

The study submission provided temperature, rainfall, and irrigation data that were taken during the biological phase of the study (April - July 1999). The study also included historical weather data (1989-1998). No meteorological abnormalities were reported by the registrant for the study period. Information pertaining to the test crop is presented below in Table B.1.2.

TABLE B.1.2. Crop Information.					
Crop; crop group	Variety	Growth stage at application	Growth stage at harvest	Harvested RAC	Harvesting procedure
Cucumber/ Cucurbit vegetables	National Pickling	Seed treatment	Mature	Cucumber fruit	Mature cucumbers were harvested by hand 87 days after planting.

B.2. Test Materials

TABLE B.2.1. Test Material Characteristics	
Chemical structure	
Radiolabel position	Labeled on the 3C and 5C positions of the triazole ring
Lot No.	Not available
Purity	>99% (HPLC and TLC)
Specific activity [1]	56 mCi/mmol 370,331 dpm/µg (before dilution with nonlabeled ipconazole) 68,030 dpm/µg (after dilution)
Code	CFQ10973

[1]The radiolabeled substance was isotopically diluted with nonlabeled ipconazole formulated as a wettable powder (WP)

B.3. Study Use Pattern

TABLE B.3.1. Use Pattern Information	
Chemical name	triazole-3,5-^{14}C-ipconazole
Application method	The isotopically diluted test substance, formulated as a WP formulation, was homogenized in water. Cucumber seeds were shaken in a jar with the test substance at Covance Laboratories. Treated seeds were then shipped to American Agricultural Services, Inc.
Application rate	Treatment plot 1: Non-treated seed (control) Treatment plot 2: 0.00241 lb ai/100 lbs of seed Treatment plot 3: 0.00929 lb ai/100 lbs of seed
Number of applications	One
Timing of applications	Seed treatment
PHI	Not applicable, seed treatment

B.4. Identification/Characterization of Residues

B.4.1. Sample Handling and Preparation

Mature cucumbers were harvested 87 days after planting (DAP). Samples of cucumbers were frozen at the field site and shipped frozen to Covance Laboratories (Madison, WI) for further processing.

B.4.2. Analytical Methodology

Total radioactive residues (TRR) were determined by combustion followed by liquid scintillation counting (LSC) of triplicate aliquots of homogenized cucumbers. Triplicate aliquots of an unfortified control sample were also analyzed. No further work was performed to identify or further characterize the radioactivity in cucumber.

C. RESULTS AND DISCUSSION

C.1. Storage Stability

Cucumber samples were frozen at the field facility and shipped frozen, within five days of harvest, to Covance Laboratories, Inc. (Madison, WI) for analysis. Actual analysis dates (i.e., dates of the LSC) were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than one month from harvest to analysis. As samples were stored for less than six months, no storage stability data are required. The storage conditions for the cucumber radiotracer study are presented in Table C.1.1.

TABLE C.1.1. Summary of Storage Conditions.

Matrix (RAC or Extract)	Storage Temp. (°C)	Actual Study Duration	Interval of Demonstrated Storage Stability
Cucumber	-10 to -30	Actual analysis dates were not reported; however, based on the analytical termination date, samples were stored for up to 8 days from harvest to LSC analysis.	No storage stability data are required.

C.2. Identification, Characterization, and Distribution of Residues

Total radioactive residues (TRR) in cucumbers are reported in Table C.2.1. TRR were less than 5 ppb in mature cucumber fruit grown from seed treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00241 and 0.00929 lb ai/100 lbs of seed. The number of dpm/g in all samples was 0. The average dpm/g of the triplicate analyses of the unfortified control sample was 2. No further work was performed to identify or further characterize the radioactivity in cucumbers.

TABLE C.2.1. Total Radioactive Residues (TRR) in Cucumber.

Treatment Rate	Timing and Applic. No.	PHI (days)	Residue (ppb)
Treatment 2: 0.00241 lb ai/100 lbs of seed	Single seed treatment	Not applicable (NA)	ND
Treatment 3: 0.00929 lb ai/100 lbs of seed	Single seed treatment	NA	ND

ND: dpm/g in samples was below that in the unfortified control

C.3. Proposed Metabolic Profile

No significant translocation of the radioactivity occurred in cucumbers from seed treatments with ipconazole.

D. CONCLUSION

The results of the radiotracer study on cucumber show that the total radioactive residues (TRR) were less than 5 ppb in mature cucumber fruit grown from seed treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00241 and 0.00929 lb ai/100 lbs of seed. No significant translocation of the radioactivity occurred in cucumbers from seed treatments with ipconazole.

E. REFERENCES

None.

F. DOCUMENT TRACKING

Petition Number: None (non-food use)
DP Barcode: D289092
PC Code: 125618

Ipconazole/7501-ROL/125618/Gustafson LLC/7501
DACO 6.3/OPPTS 860.1300/OECD II 6.2.2, 6.2.3 & IIIA 8.2, 8.4.1, 8.4.2
Radiotracer Study - Leaf Lettuce

Primary Evaluator	D. Dotson Douglas Dotson, Chemist, HED/RAB2	Date: 4/23/2004
Peer Reviewer	WT Drew William Drew, Chemist, HED/RAB2	Date: 4/23/2004

This DER was originally prepared under contract by Dynamac Corporation (20440 Century Boulevard, Suite 100; Germantown, MD 20874; submitted 01/09/2004). The DER has been reviewed by the HED and revised to reflect current OPP policies.

STUDY REPORT:

45542244 Fathulla, R. (2000) Determination of the Total Radioactive Residues of ^{14}C-labeled Ipconazole in Leaf Lettuce: Lab Study Number: 6456-118. Unpublished study prepared by Covance Laboratories Inc. 89 p.

EXECUTIVE SUMMARY:

Gustafson LLC has submitted a leaf lettuce radiotracer study performed for the purpose of determining residue levels in lettuce grown from treated seed. Leaf lettuce seeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 68,030 dpm/μg) at 0.00255 and 0.00965 lb ai/100 lbs of seed. Treated and untreated leaf lettuce seeds were planted and grown according to appropriate agronomic practices. Mature leaf lettuce was harvested 65 days after planting. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC), and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

Total radioactive residues (TRR) were below 5 ppb (non-detectable to 0.50 ppb) in mature leaf lettuce grown from seed treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00255 and 0.00965 lb ai/100 lbs of seed. No further work was performed to identify or further characterize the radioactivity in leaf lettuce.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than one month from harvest to analysis. As a result, no storage stability data are required.

STUDY/WAIVER ACCEPTABILITY/DEFICIENCIES/CLARIFICATIONS:

Under the conditions and parameters used in the radiotracer study, the leaf lettuce residue data are classified as scientifically acceptable. The acceptability of this study for regulatory purposes is addressed in the forthcoming U.S. EPA Residue Chemistry Summary Document (DP Barcode D289092).

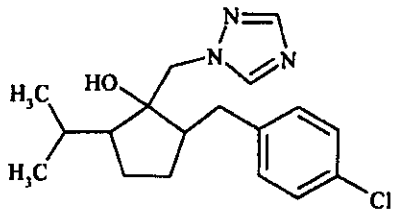
COMPLIANCE:

Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. The registrant did not report that the investigators made any deviations from regulatory requirements that would have an impact on the validity of the study.

A. BACKGROUND INFORMATION

Ipconazole is a new chemical proposed for seed treatment use on various crops. Ipconazole is a systemic broad spectrum fungicide seed dressing used to protect plants from soil borne and seed borne disease.

TABLE A.1. Test Compound Nomenclature.

Compound	
Common name	Ipconazole
Company experimental name	None specified
IUPAC name	(1*RS*, 2*SR*, 5*RS*; 1*RS*, 2*SR*, 5*SR*)-2-(4-chlorobenzyl)-5-isopropyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
CAS name	2-[(4-chlorophenyl)methyl]-5-(1-methylethyl)-1-(1*H*-1,2,4-triazol-1-ylmethyl) cyclopentanol
CAS #	125225-28-7
End-use product/EP	Vortex™ Seed Treatment Fungicide (EPA Reg. No. 7501-ROL); liquid formulation containing 40.7% ipconazole, 9.26 lb/gallon bulk density (3.77 lb ai/gallon)

The physical and chemical properties of ipconazole were submitted by the registrant as part of the product chemistry data. These data appear in MRID numbers 45542201 through 45542220. They have been reviewed by the Registration Division (RD) and are summarized in Memo, D292379, S. Mather, 11/24/03.

TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound.

Parameter	Value
Melting point/range	85-88°C
pH	5.35 (1% Suspension at 25°C)
Density	1.2 g/mL at 20°C
Water solubility	cis-cis isomer: 9 ppm cis-trans isomer: 5 ppm

TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound.		
Parameter	Value	
Solvent solubility in g/L	Acetone	570
	1,2 Dichloroethane	420
	Dichloromethane	580
	Ethyl Acetate	430
	Heptane	1.9
	Methanol	680
	n-Octanol	230
	Toluene	160
	Xylenes	150
Vapor pressure	$<5.0 \times 10^{-5}$ Pa (at both 20 and 30°C)	
Dissociation constant, pK_a	Could not be measured	
Octanol/water partition coefficient, $Log(K_{OW})$	cis-cis isomer: 4.6 cis-trans isomer: 4.4	
UV/visible absorption spectrum	222 nm: 0.74541 (Absorption AUS) 268 nm: 0.02653 (Absorption AUS)	

B. EXPERIMENTAL DESIGN

B.1. Test Site and Crop Information

TABLE B.1.1. Test Site Information				
Testing Environment	Soil characteristics			
	Type	%OM	pH	CEC (meq/100 g)
Three outdoor test plots (3'x7' each), laterally confined using a buried board perimeter and surrounded by protective fences.	Sandy loam	1.2	5.8	5.1

The study submission provided temperature, rainfall, and irrigation data that were taken during the biological phase of the study (March - June 1999). The study also included historical weather data (1989-1998). No meteorological abnormalities were reported by the registrant for the study period. Information pertaining to the test crop is presented below in Table B.1.2.

TABLE B.1.2. Crop Information.					
Crop/ Crop Group	Variety	Growth stage at application	Growth stage at harvest	Harvested RAC	Harvesting procedure
Leaf lettuce/ Leafy Vegetables (Except Brassica)	Black Seeded Simpson	Seed treatment	Mature	Leaves	Mature leaf lettuce was harvested by hand 65 days after planting. The entire aerial portion of the leaf lettuce plant was cut just above the soil surface.

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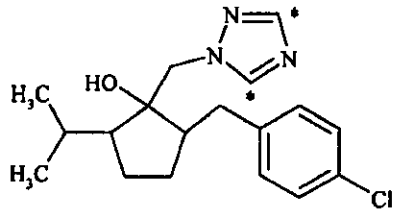
B.2. Test Materials

TABLE B.2.1. Test Material Characteristics	
Chemical structure	
Radiolabel position	Labeled on the 3C and 5C positions of the triazole ring
Lot No.	Not available
Purity	>99% (HPLC and TLC)
Specific activity [1]	56 mCi/mmole 370,331 dpm/µg (before dilution with nonlabeled ipconazole) 68,030 dpm/µg (after dilution)
Code	CFQ10973

[1]The radiolabeled substance was isotopically diluted with nonlabeled ipconazole formulated as a wettable powder (WP).

B.3. Study Use Pattern

TABLE B.3.1. Use Pattern Information	
Chemical name	triazole-3,5-^{14}C-ipconazole
Application method	The isotopically diluted test substance, formulated as a WP formulation, was homogenized in water. Leaf lettuce seeds were shaken in a jar with the test substance at Covance Laboratories. Treated seeds were then shipped to American Agricultural Services, Inc.
Application rate	Treatment plot 1: Non-treated seed (control) Treatment plot 2: 0.00255 lb ai/100 lbs of seed Treatment plot 3: 0.00965 lb ai/100 lbs of seed
Number of applications	One
Timing of applications	Seed treatment
PHI	Not applicable, seed treatment

B.4. Identification/Characterization of Residues

B.4.1. Sample Handling and Preparation

At maturity, the entire aerial portions of the leaf lettuce plants were harvested 65 days after planting. Samples of leaf lettuce were frozen at the field site and shipped frozen to Covance Laboratories (Madison, WI) for further processing.

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B.4.2. Analytical Methodology

Total radioactive residues (TRR) were determined by combustion followed by liquid scintillation counting (LSC) of triplicate aliquots of homogenized leaf lettuce. Triplicate aliquots of an unfortified control sample were also analyzed. No further work was performed to identify or further characterize the radioactivity in leaf lettuce.

C. RESULTS AND DISCUSSION

C.1. Storage Stability

Leaf lettuce samples were frozen at the field facility and shipped frozen, within six days of harvest, to Covance Laboratories, Inc. (Madison, WI) for analysis. Actual analysis dates (i.e., dates of the LSC) were not provided. Based on the analytical termination date, however, it can be concluded that samples were stored for less than one month from harvest to analysis. As samples were stored for less than six months, no storage stability data are required. The storage conditions for the leaf lettuce radiotracer study are presented in Table C.1.1.

TABLE C.1.1. Summary of Storage Conditions.

Matrix (RAC or Extract)	Storage Temp. (°C)	Actual Study Duration	Interval of Demonstrated Storage Stability
Leaf lettuce	-10 to -30	Actual analysis dates were not reported. Based on the analytical termination date, however, it can be concluded that samples were stored for up to 14 days from harvest to LSC analysis.	No storage stability data are required.

C.2. Identification, Characterization, and Distribution of Residues

Total radioactive residues (TRR) in leaf lettuce are reported in Table C.2.1. TRR were <5 ppb in mature leaf lettuce grown from seed treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00255 and 0.00965 lb ai/100 lbs of seed. Two samples were taken from each of the two plots. In one of the samples receiving the lower treatment rate, and both of the samples receiving the higher treatment rate, the number of dpm/g was below that in the unfortified control. No further work was performed to identify or further characterize the radioactivity in leaf lettuce.

TABLE C.2.1. Total Radioactive Residues (TRR) in Leaf Lettuce.

Treatment Rate	Timing and Applic. No.	PHI (days)	Residues in Leaf Lettuce (ppb)
Treatment 2: 0.00255 lb ai/100 lbs of seed	Single seed treatment	Not applicable (NA)	ND, 0.5
Treatment 3: 0.00965 lb ai/100 lbs of seed	Single seed treatment	NA	ND, ND

ND: dpm/g in samples was below that in the unfortified control sample

C.3. Proposed Metabolic Profile

No significant translocation of the radioactivity occurred in leaf lettuce from seed treatments with ipconazole.

D. CONCLUSION

The results of the radiotracer study on leaf lettuce show that the total radioactive residues (TRR) were less than 5 ppb in mature lettuce grown from seed treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00255 and 0.00965 lb ai/100 lbs of seed. No significant translocation of the radioactivity occurred in leaf lettuce grown from seed treated with ipconazole.

E. REFERENCES

None.

F. DOCUMENT TRACKING

Petition Number: None (non-food use)
DP Barcode: D289092
PC Code: 125618

Ipconazole/7501-ROL/125618/Gustafson LLC/7501
DACO 6.3/OPPTS 860.1300/OECD II 6.2.2, 6.2.3 & IIIA 8.2, 8.4.1, 8.4.2
Radiotracer Study - Sorghum

Primary Evaluator	D. Dotson Douglas Dotson, Chemist, HED/RAB2	Date: 4/23/2004
Peer Reviewer	William Drew, Chemist, HED/RAB2	Date: 4/23/2004

This DER was originally prepared under contract by Dynamac Corporation (20440 Century Boulevard, Suite 100; Germantown, MD 20874; submitted 01/09/2004). The DER has been reviewed by the HED and revised to reflect current OPP policies.

STUDY REPORT:

45542240 Fathulla, R. (2001) Determination of the Total Radioactive Residues of ^{14}C-labeled Ipconazole in Sorghum: Lab Study Number: 6456-122. Unpublished study prepared by Covance Laboratories Inc. 91 p.

EXECUTIVE SUMMARY:

Gustafson LLC has submitted a sorghum radiotracer study performed for the purpose of determining residue levels in sorghum grown from treated seed. Sorghum seeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 66,285 dpm/µg) at 0.00159, 0.00264, and 0.01118 lb ai/100 lbs of seed. Treated and untreated sorghum seeds were planted and grown according to appropriate agronomic practices. Sorghum forage was harvested 73 days after planting (DAP). Mature sorghum was cut 115 DAP, and sorghum grain was collected. The stover was allowed to dry in the field/greenhouse for 21 days prior to collection. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC), and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

Total radioactive residues (TRR) in sorghum forage grown from seed treated with [triazole-3,5-^{14}C]ipconazole at levels of 0.00159, 0.00264, and 0.01118 lb ai/100 lbs of seed were 0.38, 0.56, and 1.30 ppb, respectively. TRR in sorghum grain grown from seed treated at the same levels were 0.71, 0.53, and 2.13 ppb, respectively, and TRR in stover were 0.27, 0.42, and 0.98 ppb, respectively. No further work was performed to identify or further characterize the radioactivity in sorghum forage, grain, and stover.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that sorghum forage samples were stored for 69 days, and sorghum grain and stover samples were stored 27 days from harvest to analysis. As a result, no storage stability data are required because samples were stored frozen for less than six months.

STUDY/WAIVER ACCEPTABILITY/DEFICIENCIES/CLARIFICATIONS:

Under the conditions and parameters used in the radiotracer study, the sorghum forage, grain, and stover residue data are classified as scientifically acceptable. The acceptability of this study for regulatory purposes is addressed in the forthcoming U.S. EPA Residue Chemistry Summary Document (DP Barcode D289092).

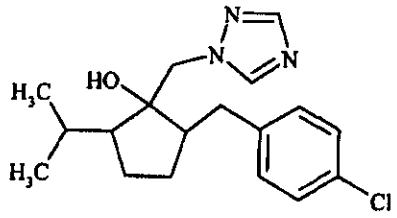
COMPLIANCE:

Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. The registrant did not report that the investigators made any deviations from regulatory requirements that would have an impact on the validity of the study.

A. BACKGROUND INFORMATION

Ipconazole is a new chemical proposed for seed treatment use on various crops. Ipconazole is a systemic broad spectrum fungicide seed dressing used to protect plants from soil borne and seed borne disease.

TABLE A.1. Test Compound Nomenclature.

Compound	
Common name	Ipconazole
Company experimental name	None specified
IUPAC name	(1*RS*, 2*SR*, 5*RS*; 1*RS*, 2*SR*, 5*SR*)-2-(4-chlorobenzyl)-5-isopropyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
CAS name	2-[(4-chlorophenyl)methyl]-5-(1-methylethyl)-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
CAS #	125225-28-7
End-use product/EP	Vortex™ Seed Treatment Fungicide (EPA Reg. No. 7501-ROL); liquid formulation containing 40.7% ipconazole, 9.26 lb/gallon bulk density (3.77 lb ai/gallon)

The physical and chemical properties of ipconazole were submitted by the registrant as part of the product chemistry data. These data appear in MRID numbers 45542201 through 45542220. They have been reviewed by the Registration Division (RD) and are summarized in Memo, D292379, S. Mather, 11/24/03.

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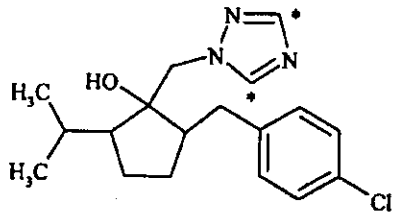
TABLE B.1.2. Crop Information.					
Crop/ Crop Group	Variety	Growth stage at application	Growth stage at harvest	Harvested RAC	Harvesting procedure
Sorghum/ Cereal Grain	Pioneer Brand 84G62	Seed treatment	Immature sorghum (forage) and mature sorghum (grain and stover)	Sorghum forage, grain, and stover	Sorghum forage was harvested 73 days after planting (DAP); sorghum grain was harvested 115 DAP; and sorghum stover was cut 115 DAP and allowed to dry for 21 days prior to collection.

B.2. Test Materials

TABLE B.2.1. Test Material Characteristics	
Chemical structure	
Radiolabel position	Labeled on the 3C and 5C positions of the triazole ring
Lot No.	Not available
Purity	>99% (HPLC and TLC)
Specific activity [1]	56 mCi/mmol 370,331 dpm/µg (before dilution with nonlabeled ipconazole) 66,285 dpm/µg (after dilution)
Code	CFQ10973

[1]The radiolabeled substance was isotopically diluted with nonlabeled ipconazole formulated as wettable powder (WP).

B.3. Study Use Pattern

TABLE B.3.1. Use Pattern Information	
Chemical name	triazole-3,5-^{14}C-ipconazole
Application method	The isotopically diluted test substance, formulated as a WP formulation, was homogenized in ethanol:water (1:1, v:v). Sorghum seeds were shaken in a jar with the test substance at Covance Laboratories (Madison, WI). Treated seeds were shipped to American Agricultural Services, Inc (Lucama, NC).
Application rate	Treatment plot 1: Non-treated seed (control) Treatment plot 2: 0.00159 lb ai/100 lbs of seed Treatment plot 3: 0.00264 lb ai/100 lbs of seed Treatment plot 4: 0.01118 lb ai/100 lbs of seed
Number of applications	One
Timing of applications	Seed treatment
PHI	Not applicable, seed treatment

B.4. Identification/Characterization of Residues

B.4.1. Sample Handling and Preparation

Sorghum forage was harvested 73 days after planting (DAP). Mature sorghum was cut and sorghum grain was harvested 115 DAP. The stover was left in the field to dry for 17 days and then transferred to a greenhouse (to protect from rainfall). The stover was then allowed to dry an additional 4 days prior to collection. Samples of sorghum forage, grain, and stover were frozen at the field site and shipped to Covance Laboratories (Madison, WI) for further processing.

B.4.2. Analytical Methodology

Total radioactive residues (TRR) were determined by combustion followed by liquid scintillation counting (LSC) in triplicate aliquots of homogenized sorghum forage, grain, and stover. Triplicate aliquots of an unfortified control sample were also analyzed. No further work was performed to identify or further characterize the radioactivity in sorghum forage, grain, and stover.

C. RESULTS AND DISCUSSION

C.1. Storage Stability

Sorghum forage and grain samples were frozen at the field facility and shipped frozen, within three days of harvest, to Covance Laboratories, Inc. (Madison, WI) for analysis. Sorghum stover samples were harvested, allowed to dry in the field and greenhouse for 21 days prior to collection. Three days after collection, sorghum stover samples were frozen and shipped to Covance Laboratories, Inc. for analysis. Actual analysis dates (i.e., dates of the LSC) were not provided. Based on the analytical termination date, however, it can be concluded that sorghum forage samples were stored for a maximum of 69 days, and sorghum grain and stover samples were stored for a maximum of 27 days from harvest to analysis. As samples were stored for less than six months from harvest to analysis, no storage stability data are required. The storage conditions for the sorghum radiotracer study are presented in Table C.1.1.

TABLE C.1.1. Summary of Storage Conditions.

Matrix (RAC or Extract)	Storage Temp. (°C)	Actual Study Duration	Interval of Demonstrated Storage Stability
Sorghum forage	-10 to -30	Actual analysis dates were not reported. Based on the analytical termination date, however, it can be concluded that samples of sorghum forage were stored up to 69 days from harvest to analysis.	No storage stability data are required.
Sorghum grain		Actual analysis dates were not reported. Based on the analytical termination date, however, it can be concluded that samples of sorghum grain and stover were stored up to 27 days from harvest to analysis.	
Sorghum stover			

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INSERT 1 (page 3)

With respect to which crops (in addition to those which have radiolabeled data) can be considered non-food uses, HED will use a crop group approach that was discussed with the petitioner in several pre-registration meetings (R. Loranger, 9/23/98 and 2/9/99). The results for carrots support a non-food use for the requested seed treatment of root and tuber vegetables. Similarly, the lettuce data will cover the proposed uses on leafy vegetables (both Brassica and non-Brassica). The cucumber data support the seed treatment of cucurbit vegetables as a non-food use. The sorghum, cotton and canola uses are also non-food based on the three studies submitted for those crops. In addition, the cotton data will be translated to sunflower and the canola data to mustard and rape. In the case of corn (field, pop, sweet), the uses can be considered non-food if the maximum application rate is 0.0013 lb ai/100 lb seed or less. Assuming residues are proportional to the rate, this use would result in <5 ppb TRR in corn grain (where 5.5 ppb TRR was found after treatment at 0.0015 lb ai/100 lb seed).

Although uses discussed in the previous paragraph can be considered non-food, HED can not conclude that all of the requested uses are non-food due to the uptake of total radioactivity greater than 5 ppb in wheat forage/hay/straw and soybean hay. As a result, the following label changes are recommended. The cereal grain uses should be limited to just corn and sorghum. Other grains such as millet, oats, rice, and rye should be removed from the label. With the exception of turfgrass (which is not a food or feed crop), the uses on the grass forage, fodder, and hay group should also be deleted. Finally, treatment of all nongrass animal feeds also needs to be dropped.

In summary, HED can conclude that the following ipconazole seed treatment uses are non-food: root and tuber vegetables, leafy vegetables (Brassica and non-Brassica), cucurbit vegetables, corn (field, pop, sweet)(provided label is amended to maximum rate of 0.0013lb ai/100 lb seed), sorghum, cotton, sunflower, canola, rape, mustard, and turfgrass.

INSERT 2 (page 8)

Prior to generation of their data, Gustafson discussed the site of the ^{14}C radiolabel with HED (aforementioned meetings with R. Loranger). At that time it was agreed that, provided uptake of activity from the triazole ring labeled ipconazole was greater than that from benzyl ring labeled compound in the wheat and soybean studies, the use of just the triazole label in the other crops would be acceptable. Although HED has not generated DER's for the wheat and soybean studies, examination of those data confirmed that uptake of the triazole label was significantly higher than the benzyl label in all the wheat and soybean RAC's. TRR's from the benzyl label were all <2 ppb except for wheat straw at the highest application rate where the total residue was 5.1 ppb. Therefore, use of only the triazole labeled ipconazole in the other studies is acceptable.

Ipconazole/7501-ROL/125618/Gustafson LLC/7501
DACO 6.3/OPPTS 860.1300/OECD II 6.2.2, 6.2.3 & IIIA 8.2, 8.4.1, 8.4.2
Radiotracer Study - Canola

Primary Evaluator	D. Dotson Douglas Dotson, Chemist, HED/RAB2	Date: 4/23/2004
Peer Reviewer	WTDrew William Drew, Chemist, HED/RAB2	Date: 4/23/2004

This DER was originally prepared under contract by Dynamac Corporation (20440 Century Boulevard, Suite 100; Germantown, MD 20874; submitted 01/09/2004). The DER has been reviewed by the HED and revised to reflect current OPP policies.

STUDY REPORT:

45542247 Fathulla, R. (2001) Determination of the Total Radioactive Residues of ^{14}C-labeled Ipconazole in Canola: Lab Study Number: 6456-115. Unpublished study prepared by Covance Laboratories Inc. 90 p.

EXECUTIVE SUMMARY:

Gustafson LLC has submitted a canola radiotracer study performed for the purpose of determining residue levels in canola treated with ipconazole. Canola seeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 66,555 dpm/µg) at 0.00186, 0.00295, and 0.01086 lb ai/100 lbs of seed. Treated and untreated canola seeds were planted and grown according to appropriate agronomic practices. Mature canola was cut 206 days after planting and allowed to dry for 9 days prior to threshing. Canola seed (grain) samples were collected after threshing. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC), and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

Total radioactive residues (TRR) in mature canola seed grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00186, 0.00295, and 0.01086 lb ai/100 lbs of seed were 0.57-0.81, 0.83-1.10, and 4.60-4.78 ppb, respectively. No further work was performed to identify or further characterize the radioactivity in canola seed.

The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that canola seed samples were stored for a maximum of 52 days from harvest to analysis. As a result, no storage stability data are required because samples were stored frozen for less than six months.

STUDY/WAIVER ACCEPTABILITY/DEFICIENCIES/CLARIFICATIONS:

Under the conditions and parameters used in the radiotracer study, the canola seed residue data are classified as scientifically acceptable. The acceptability of this study for regulatory purposes

is addressed in the forthcoming U.S. EPA Residue Chemistry Summary Document (DP Barcode D289092).

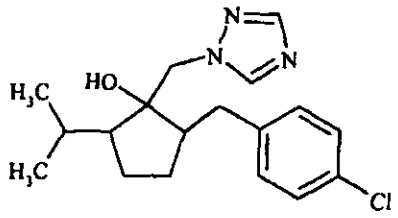
COMPLIANCE:

Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. The registrant did not report that the investigators made any deviations from regulatory requirements that would have an impact on the validity of the study.

A. BACKGROUND INFORMATION

Ipconazole is a new chemical proposed for seed treatment use on various crops. Ipconazole is a systemic broad spectrum fungicide seed dressing used to protect plants from soil borne and seed borne disease.

TABLE A.1. Test Compound Nomenclature.

Compound	
Common name	Ipconazole
Company experimental name	None specified
IUPAC name	(1*RS*, 2*SR*, 5*RS*; 1*RS*, 2*SR*, 5*SR*)-2-(4-chlorobenzyl)-5-isopropyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
CAS name	2-[(4-chlorophenyl)methyl]-5-(1-methylethyl)-1-(1*H*-1,2,4-triazol-1-ylmethyl) cyclopentanol
CAS #	125225-28-7
End-use product/EP	Vortex™ Seed Treatment Fungicide (EPA Reg. No. 7501-ROL); liquid formulation containing 40.7% ipconazole, 9.26 lb/gallon bulk density (3.77 lb ai/gallon)

The physical and chemical properties of ipconazole were submitted by the registrant as part of the product chemistry data. These data appear in MRID numbers 45542201 through 45542220. They have been reviewed by the Registration Division (RD) and are summarized in Memo, D292379, S. Mather, 11/24/03.

TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound.

Parameter	Value
Melting point/range	85-88°C
pH	5.35 (1% Suspension at 25°C)
Density	1.2 g/mL at 20°C

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TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound.		
Parameter	Value	
Water solubility	cis-cis isomer: 9 ppm cis-trans isomer: 5 ppm	
Solvent solubility in g/L	Acetone	570
	1,2 Dichloroethane	420
	Dichloromethane	580
	Ethyl Acetate	430
	Heptane	1.9
	Methanol	680
	n-Octanol	230
	Toluene	160
	Xylenes	150
Vapor pressure	<5.0 x 10^{-5} Pa (at both 20 and 30°C)	
Dissociation constant, pK_a	Could not be measured	
Octanol/water partition coefficient, $Log(K_{ow})$	cis-cis isomer: 4.6 cis-trans isomer: 4.4	
UV/visible absorption spectrum	222 nm: 0.74541 (Absorption AUS) 268 nm: 0.02653 (Absorption AUS)	

B. EXPERIMENTAL DESIGN

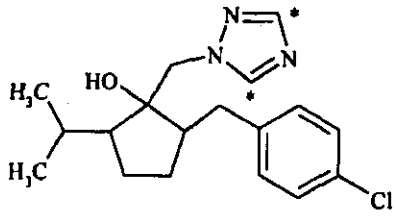
B.1. Test Site and Crop Information

TABLE B.1.1. Test Site Information				
Testing Environment	Soil characteristics			
	Type	%OM	pH	CEC (meq/100 g)
Four outdoor test plots (3'x7' each), laterally confined using a buried board perimeter and surrounded by protective fences.	Sandy loam	1.3	5.7	7.2

The study submission provided temperature, rainfall, and irrigation data that were taken during the biological phase of the study (October 1998 - May 1999). The study also included historical weather data (1988-1997). No meteorological abnormalities were reported by the registrant for the study period. Information pertaining to the test crop is presented below in Table B.1.2.

TABLE B.1.2. Crop Information.					
Crop; crop group	Variety	Growth stage at application	Growth stage at harvest	Harvested RAC	Harvesting procedure
Canola/ Miscellaneous commodity	Pioneer Brand 46A65	Seed treatment	Mature	Canola seed	Mature canola was cut approximately one inch above the soil surface 206 days after planting and allowed to dry for 9 days prior to threshing.

B.2. Test Materials

TABLE B.2.1. Test Material Characteristics	
Chemical structure	
Radiolabel position	Labeled on the 3C and 5C positions of the triazole ring
Lot No.	Not available
Purity	>99% (HPLC and TLC)
Specific activity [1]	56 mCi/mmol 370,331 dpm/µg (before dilution with nonlabeled ipconazole) 66,555 dpm/µg (after dilution)
Code	CFQ10973

[1]The radiolabeled substance was isotopically diluted with nonlabeled ipconazole technical.

B.3. *Study Use Pattern*

TABLE B.3.1. Use Pattern Information	
Chemical name	triazole-3,5-^{14}C-ipconazole
Application method	The isotopically diluted test substance was homogenized in ethanol. Canola seeds were shaken in a jar with the test substance at Covance Laboratories. Treated seeds were then shipped to American Agricultural Services, Inc.
Application rate	Treatment plot 1: Non-treated seed (control) Treatment plot 2: 0.00186 lb ai/100 lbs of seed Treatment plot 3: 0.00295 lb ai/100 lbs of seed Treatment plot 4: 0.01086 lb ai/100 lbs of seed
Number of applications	One
Timing of applications	Seed treatment
PHI	Not applicable, seed treatment

B.4. Identification/Characterization of Residues

B.4.1. Sample Handling and Preparation

At maturity, canola plants were cut approximately one inch above the soil surface 206 days after planting (DAP). The cut plants were transported to greenhouses and allowed to dry for 9 days prior to threshing. Threshed samples of canola seed (grain) were frozen at the field site and shipped frozen to Covance Laboratories (Madison, WI) for further processing.

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B.4.2. Analytical Methodology

Total radioactive residues (TRR) were determined by combustion followed by liquid scintillation counting (LSC) of triplicate aliquots of homogenized canola seed. Triplicate aliquots of an unfortified control sample were also analyzed. No further work was performed to identify or further characterize the radioactivity in canola seed.

C. RESULTS AND DISCUSSION

C.1. Storage Stability

Canola seed samples were frozen at the field facility and shipped frozen, within 16 days of harvest, to Covance Laboratories, Inc. (Madison, WI) for analysis. The study dates concerning LSC analysis were not provided. Based on the analytical termination date, however, it can be concluded that canola seed samples were stored for 52 days from harvest to analysis. As a result, no storage stability data are required because samples were stored frozen for less than six months. The storage conditions for the canola radiotracer study are presented in Table C.1.

TABLE C.1.1. Summary of Storage Conditions.

Matrix (RAC or Extract)	Storage Temp. (°C)	Actual Study Duration	Interval of Demonstrated Storage Stability
Canola seed	-10 to -30	Actual analysis dates were not reported; however, based on the analytical termination date, samples were stored for up to 52 days from harvest to LSC analysis.	No storage stability data are required.

C.2. Identification, Characterization, and Distribution of Residues

Total radioactive residues (TRR) in canola seed are reported in Table C.2.1. Mean TRR values for canola seed grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00186, 0.00295, and 0.01086 lb ai/100 lbs of seed were 0.69 ppb, 0.97 ppb, and 4.69 ppb, respectively. No further work was performed to identify or further characterize the radioactivity in canola seed.

TABLE C.2.1. Total Radioactive Residues (TRR) in Canola Seed.

Treatment Rate	*Timing and Applic. No.*	*PHI (days)*	Residue (ppb)
Treatment 2: 0.00186 lb ai/100 lbs of seed	Single seed treatment	Not applicable (NA)	0.57, 0.81
Treatment 3: 0.00295 lb ai/100 lbs of seed	Single seed treatment	NA	0.83, 1.10
Treatment 4: 0.01086 lb ai/100 lbs of seed	Single seed treatment	NA	4.60, 4.78

C.3. Proposed Metabolic Profile

No significant translocation of the radioactivity occurred in canola seed from seed treatments with ipconazole.

D. CONCLUSION

The results of the radiotracer study on canola show that the total radioactive residues (TRR) were less than 5 ppb in mature canola seed grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00186, 0.00295, and 0.01086 lb ai/100 lbs of seed. No significant translocation of the radioactivity occurred in canola seed from seed treatments with ipconazole.

E. REFERENCES

None.

F. DOCUMENT TRACKING

Petition Number: None (non-food use)
DP Barcode: D289092
PC Code: 125618

Ipconazole/7501-ROL/125618/Gustafson LLC/7501
DACO 6.3/OPPTS 860.1300/OECD II 6.2.2, 6.2.3 & IIIA 8.2, 8.4.1, 8.4.2
Radiotracer Study - Carrot

Primary Evaluator	D. Dotson Douglas Dotson, Chemist, HED/RAB2	Date: 4/23/2004
Peer Reviewer	WT Drew William Drew, Chemist, HED/RAB2	Date: 4/23/2004

This DER was originally prepared under contract by Dynamac Corporation (20440 Century Boulevard, Suite 100; Germantown, MD 20874; submitted 01/09/2004). The DER has been reviewed by the HED and revised to reflect current OPP policies.

STUDY REPORT:

45542245 Fathulla, R. (2001) Determination of the Total Radioactive Residues of ^{14}C-labeled Ipconazole in Carrot: Lab Study Number: 6456-117. Unpublished study prepared by Covance Laboratories Inc. 96 p.

EXECUTIVE SUMMARY:

Gustafson LLC has submitted a carrot radiotracer study performed for the purpose of determining residue levels in carrots grown from seeds treated with ipconazole. Carrot seeds were treated with [triazole-3,5-^{14}C]ipconazole (specific activity 68,030 dpm/μg) at 0.00236 and 0.00928 lb ai/100 lbs of seed. Treated and untreated carrot seeds were planted and grown according to appropriate agronomic practices. Mature carrots were harvested 85 days after planting and separated into carrot tops and roots. The biological phase of the study was conducted by American Agricultural Services, Inc. (Lucama, NC), and the analytical phase of the study was conducted by Covance Laboratories, Inc. (Madison, WI).

Total radioactive residues (TRR) in mature carrot tops grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00236 and 0.00928 lb ai/100 lbs of seed were 0.32-0.49 and 0.56-0.87 ppb, respectively. TRR in carrot roots grown from seeds treated at these same levels were nondetectable (i.e., average dpm/g in samples was below that of the unfortified control sample) and 0.10-0.32 ppb, respectively. No further work was performed to identify or further characterize the radioactivity in carrot tops and roots.

Samples were stored for 15 days from harvest to analysis. No storage stability data are required as samples were stored for less than six months.

STUDY/WAIVER ACCEPTABILITY/DEFICIENCIES/CLARIFICATIONS:

The carrot radiotracer study is classified as scientifically acceptable. The acceptability of this study for regulatory purposes is addressed in the forthcoming U.S. EPA Residue Chemistry Summary Document (DP Barcode D289092).

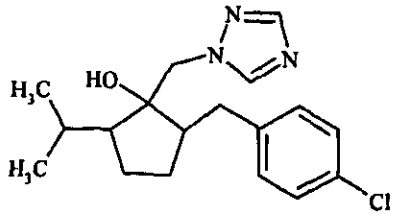
COMPLIANCE:

Signed and dated GLP, Quality Assurance and Data Confidentiality statements were provided. The registrant did not report that the investigators made any deviations from regulatory requirements that would have an impact on the validity of the study.

A. BACKGROUND INFORMATION

Ipconazole is a new chemical proposed for seed treatment use on various crops. Ipconazole is a systemic broad spectrum fungicide seed dressing used to protect plants from soil borne and seed borne disease.

TABLE A.1. Test Compound Nomenclature.

Compound	
Common name	Ipconazole
Company experimental name	None specified
IUPAC name	(1*RS*, 2*SR*, 5*RS*; 1*RS*, 2*SR*, 5*SR*)-2-(4-chlorobenzyl)-5-isopropyl-1-(1*H*-1,2,4-triazol-1-ylmethyl)cyclopentanol
CAS name	2-[(4-chlorophenyl)methyl]-5-(1-methylethyl)-1-(1*H*-1,2,4-triazol-1-ylmethyl) cyclopentanol
CAS #	125225-28-7
End-use product/EP	Vortex™ Seed Treatment Fungicide (EPA Reg. No. 7501-ROL); liquid formulation containing 40.7% ipconazole, 9.26 lb/gallon bulk density (3.77 lb ai/gallon)

The physical and chemical properties of ipconazole were submitted by the registrant as part of the product chemistry data. These data appear in MRID numbers 45542201 through 45542220. They have been reviewed by the Registration Division (RD) and are summarized in Memo, D292379, S. Mather, 11/24/03.

TABLE A.2. Physicochemical Properties of the Technical Grade Test Compound.		
Parameter	Value	
Melting point/range	85-88°C	
pH	5.35 (1% Suspension at 25°C)	
Density	1.2 g/mL at 20°C	
Water solubility	cis-cis isomer: 9 ppm *cis-trans isomer*: 5 ppm	
Solvent solubility in g/L	Acetone	570
	1,2 Dichloroethane	420
	Dichloromethane	580
	Ethyl Acetate	430
	Heptane	1.9
	Methanol	680
	n-Octanol	230
	Toluene	160
	Xylenes	150
Vapor pressure	<5.0 x 10^{-5} Pa (at both 20 and 30°C)	
Dissociation constant, pK_a	Could not be measured	
Octanol/water partition coefficient, $Log(K_{ow})$	*cis-cis isomer*: 4.6 cis-trans isomer: 4.4	
UV/visible absorption spectrum	222 nm: 0.74541 (Absorption AUS) 268 nm: 0.02653 (Absorption AUS)	

B. EXPERIMENTAL DESIGN

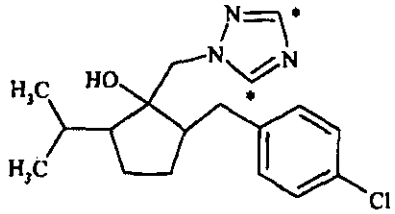
B.1. Test Site and Crop Information

TABLE B.1.1. Test Site Information				
Testing Environment	*Soil characteristics*			
	Type	%OM	pH	CEC (meq/100 g)
Three outdoor test plots (3'x7' each), laterally confined using a buried board perimeter and surrounded by protective fences.	Sandy loam	1.2	5.7	5.4

The study submission provided temperature, rainfall, and irrigation data that were recorded during the biological phase of the study (March - June 1999). The study also included historical weather data (1989-1998). No meteorological abnormalities were reported by the registrant for the study period. Information pertaining to the test crop is presented below in Table B.1.2.

TABLE B.1.2. Crop Information.					
Crop; crop group	Variety	Growth stage at application	Growth stage at harvest	Harvested RAC	Harvesting procedure
Carrot/ Root and Tuber Vegetables	Danvers Half-long	Seed treatment	Mature	Carrot roots and tops	Mature carrots were harvested by hand 85 days after planting. Carrots were pulled and adhering soil was gently removed by brushing. Carrots were separated into tops and roots.

B.2. Test Materials

TABLE B.2.1. Test Material Characteristics	
Chemical structure	
Radiolabel position	Labeled on the 3C and 5C positions of the triazole ring
Lot No.	Not available
Purity	>99% (HPLC and TLC)
Specific activity [1]	56 mCi/mmol 370,331 dpm/µg (before dilution with nonlabeled ipconazole) 68,030 dpm/µg (after dilution)
Code	CFQ10973

[1]The radiolabeled substance was isotopically diluted with nonlabeled ipconazole formulated as a wettable powder (WP).

B.3. Study Use Pattern

TABLE B.3.1. Use Pattern Information	
Chemical name	triazole-3,5-^{14}C-ipconazole
Application method	The isotopically diluted test substance, formulated as a WP formulation, was homogenized in water. Carrot seeds were shaken in a jar with the test substance at Covance Laboratories. Treated seeds were then shipped to American Agricultural Services, Inc.
Application rate	Treatment plot 1: Non-treated seed (control) Treatment plot 2: 0.00236 lb ai/100 lbs of seed Treatment plot 3: 0.00928 lb ai/100 lbs of seed
Number of applications	One
Timing of applications	Seed treatment
PHI	Not applicable, seed treatment

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B.4. Identification/Characterization of Residues

B.4.1. Sample Handling and Preparation

At maturity, the entire aerial portions of the carrot tops were harvested and the entire underground portions, including crowns, were harvested for the root samples. Samples of carrot tops and roots were frozen at the field site and shipped frozen to Covance Laboratories (Madison, WI) for further processing.

B.4.2. Analytical Methodology

Total radioactive residues (TRR) were determined by combustion followed by liquid scintillation counting (LSC) of triplicate aliquots of homogenized carrot tops and roots. Triplicate aliquots of an unfortified control sample were also analyzed. No further work was performed to identify or further characterize the radioactivity in carrot tops and roots.

C. RESULTS AND DISCUSSION

C.1. Storage Stability

Carrot top and root samples were frozen at the field facility and shipped frozen, within six days of harvest, to Covance Laboratories, Inc. (Madison, WI) for analysis. Samples were stored for 15 days from harvest to analysis. As samples were stored for less than six months, storage stability data are not required.

TABLE C.1.1. Summary of Storage Conditions.

Matrix (RAC or Extract)	Storage Temp. (°C)	Actual Study Duration	Interval of Demonstrated Storage Stability
Carrot tops	-10 to -30	Samples were stored for 15 days from harvest to analysis.	None provided
Carrot roots			

C.2. Identification, Characterization, and Distribution of Residues

Total radioactive residues (TRR) in carrot tops and roots are reported in Table C.2.1. TRR in mature carrot tops grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00236 and 0.00928 lb ai/100 lbs of seed were 0.32-0.49 and 0.56-0.87 ppb, respectively. TRR in carrot roots grown from seeds treated at the same levels were nondetectable and 0.10-0.32 ppb, respectively. In samples where residues were reported as nondetectable, the number of dpm/g in samples was below that in the unfortified control sample. No further work was performed to identify or further characterize the radioactivity in carrot tops and roots.

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TABLE C.2.1. Total Radioactive Residues (TRR) in Carrot Tops and Roots.				
Treatment Rate	Timing and Applic. No.	PHI (days)	Carrot tops	Carrot roots
			ppb	ppb
Treatment 2: 0.00236 lb ai/100 lbs of seed	Single seed treatment	Not applicable (NA)	0.32, 0.49	ND, ND
Treatment 3: 0.00928 lb ai/100 lbs of seed	Single seed treatment	NA	0.56, 0.87	0.10, 0.32

ND: dpm/g in samples was below that in unfortified control

C.3. Proposed Metabolic Profile

No significant translocation of the radioactivity occurred in carrot tops and roots from seed treatments with ipconazole.

D. CONCLUSION

The results of the radiotracer study on carrot show that the total radioactive residues (TRR) were less than 5 ppb in mature carrot tops and roots grown from seeds treated with [triazole-3,5-^{14}C]ipconazole at treatment levels of 0.00236 and 0.00928 lb ai/100 lbs of seed. No significant translocation of the radioactivity occurred in carrot tops and roots from seed treatments with ipconazole.

E. REFERENCES

None.

F. DOCUMENT TRACKING

Petition Number: None (Non-food use)
DP Barcode: D289092
PC Code: 125618